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THE CAVALRY JOURNAL

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"The strife is o'er,
The battle done;"

JANUARY-FEBRUARY, 1946

The Cavalry Journal Plans to Reissue Chamberlin's Books on Horsemanship

THE CAVALRY JOURNAL is negotiating for the publication rights of the two classical books on horsemanship by the late General Harry D. Chamberlin, which have been out of print for some time: *Riding and Schooling Horses,* and *Training Hunters, Jumpers, and Hacks.*

These two books have been in constantly growing demand by horsemen all over the country. In order to judge the advisability of republishing these two books, THE CAVALRY JOURNAL would like to hear from those readers interested in purchasing new editions.

Riding and Schooling Horses runs to about 220 pages with index, and contains about 60 sparkling photographs and drawings illustrating every detail of the text. *Training Hunters, Jumpers, and Hacks* runs about the same size. We plan to issue books at about $4.00 each.

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But don't forget: our plans to republish these books will depend entirely on the reception our readers give the idea, so write us at once.

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Organized November 9, 1885

The aim and purpose of the Association shall be to disseminate knowledge of the military art and science, to promote the professional improvement of its members, and to preserve and foster the spirit, the traditions, and solidarity of the Cavalry of the Army of the United States.—Article III, Constitution.

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CONTENTS

15TH CAVALRY GROUP: Conclusion 2
Assault Guns in Defensive Action 3
By Captain Edwin E. Lassen
British-American Contact 4
A Night Patrol in the Siegfried 7
By Captain Norman F. Ralston
The Relief of An Armored Division 9
By Major Herman M. Marlow
Cavalry Holds a River Line 9
Major W. E. Hudson
COMMUNICATIONS IN COMBAT 11
By Captain Carl E. Seitz
THE BATTLE OF THE ROER 13
OPERATION SNARE 15
By Captain John E. Newlin
SUNDAY MATINEE IN GERMANY (picture layout) 17
HORSE CAVALRY IN THE PHILIPPINES 18
By Major Harold D. Steward
SAMURAI SWORDS COMMEMORATE CAVALRY HEROES 18
JUNGLE PACK OPERATION 19
OUTGUESSING THE ENEMY 23
By Captain W. H. Whyte, Jr.
21ST BRITISH ARMY GROUP IN EUROPE, 1944-45 27
By Field Marshal Sir Bernard L. Montgomery, G.C.B., D.S.O.
THE ARMORED ENGINEERS 36
EDITORIALS 39
LONG TERM STORAGE 41
By Colonel Fred I. Gilbert
WHERE IS THAT STORM? 45
GREATEST SMOKE SCREENS IN HISTORY 47
By Lieutenant D. Wilson MacArthur
A CHEMICAL EMPIRE FALLS 49
By Volta Torrey
SOME FEATURES OF MODERN WARFARE 51
By Major General M. Galaktionov
GERMAN PLAN FOR INVADING BRITAIN 53
ROLLING DYNAMIC BUOYANCY 55
THEY PIONEERED A CHANNEL TO TOKYO 56
By Commander Harold Bradley Say
BRITISH HORSES IN WORLD WAR II (picture layout) 60
WHO BEATS PHANTOM? 62
By Major John North
LAST WORD FROM WAKE 64
By Major Henry Stanley Wilson
FOUR ARMIES TRAINED BY GREAT BRITAIN 67
By Major Ernest Watkins
PRO PAYS OFF IN BATTLE 69
By Major Harold D. Steward
JOB TRAINING 71
By 1st Lieutenant Walter J. Schweitzer
ARMORED DIVISIONS IN WORLD WAR II 73
BOOK REVIEWS 75

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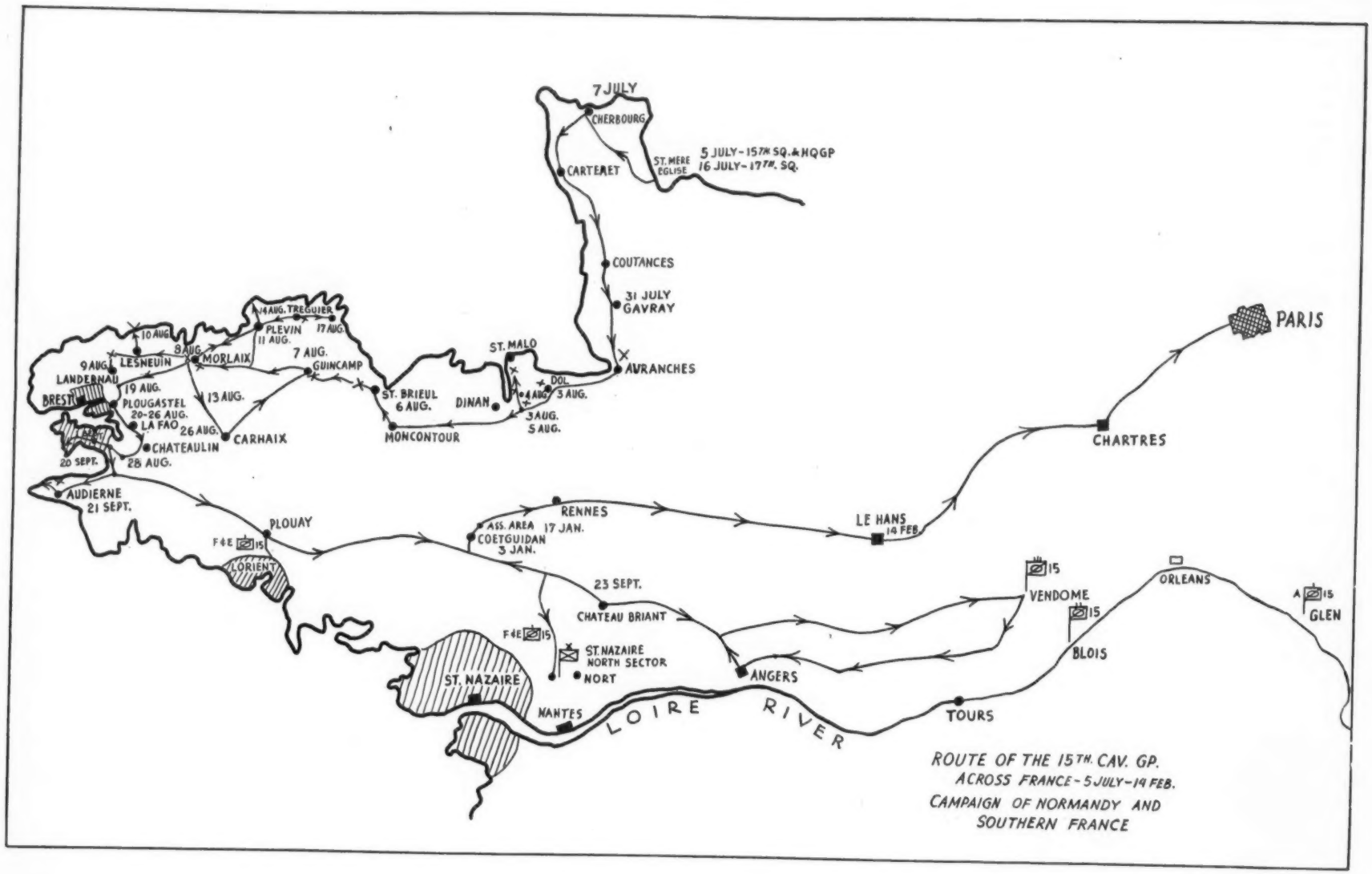


ROUTE OF THE 15TH. CAV. GP.
ACROSS FRANCE - 5 JULY - 19 FEB.
CAMPAIGN OF NORMANDY AND
SOUTHERN FRANCE

15th CAVALRY GROUP

CONCLUSION

Assault Guns in Defensive Action

by Captain Edwin E. Lassen

FROM October, 1944, to February, 1945, the 17th Cavalry Reconnaissance Squadron was engaged in an entirely defensive rôle with the Ninth Army. From the beginning, Troop E (assault guns) directly supported the squadron with indirect fire, except on a few occasions when German positions were too close for such fire.

During the last week in October, the 17th Squadron was attached to the 113th Cavalry Group, then on the left of the Ninth Army. Troop E of the 17th Squadron relieved Troop E of the 125th and took over its positions. Both the Germans and our own troops were engaged in intensive patrolling, and defensive firing had to be closely coördinated with the troops.

The targets fired upon were numerous, and included enemy engaged in digging new positions, German patrols, harassing missions, and static defensive positions. The guns had been registered on likely avenues of approach, and the data recorded so that fire could be quickly laid. Guns were fired daily on check points to determine any change required in the firing data because of weather changes or gun movements.

When the squadron relieved elements of the 120th Regiment, Troop E was attached to the FA battalion of the 30th Division, and went into position at Frenhoven, some 3,000 yards from the front lines, where it handled all fire missions for the 17th Squadron. This attachment increased the battalion's fire power from 12 to 16 guns, and the battalion's data on troop positions enabled the combination to produce more effective fire.

There was such a severe shortage of artillery ammunition, especially 105mm and 155mm, that the battalions were limited to approximately three rounds per gun per day. Ammunition for 75mms was never limited, however, and the FA battalion employed assault guns to great advantage. They were used for all types of missions, from TOT to harassing fire. Near the end of Troop E's tour of duty with the battalion, it was firing on such choice targets as troop concentrations, gun positions, vehicles, etc. Because of the combined weight of the tank and gun there was little dispersion during heavy firing, and the FA battalion was enthusiastic about the firing speed and accuracy of the weapons.

When the 30th Division moved south to meet the onrushing Germans in the Ardennes forest, the squadron was attached to the 29th Division. The assault guns, again working under the control of a FA battalion, were set up east of Pattern within 1,500 yards of the front lines. The position was in a ravine which could be reached by a concealed route. Thirty feet in front of the guns a bank concealed the muzzle blast at night, thus providing concealment from any German OP, and cover from all except high trajectory weapon fire.

The guns remained in this position until December 24. Because of the unlimited amount of 75mm ammunition, the assault guns were used to cover the entire division front. As many as 500 rounds were fired each night, and 200 during the day. The troop again was complimented for its fire discipline, speed, and the accuracy of its fire, which were made possible by the 360-degree traverse of the turret.

On December 24, the squadron was attached to the extreme left flank of the Ninth Army, and moved into the small town of Suggerath, approximately 4,000 yards north of Gelsenkirchen, Germany. The 6 guns went into position in the village, which was in a valley that provided concealment, and was difficult for the enemy to fire upon. Again the troop was attached to a FA battalion, which was a part of the 102d Division.

It remained here for three weeks, and fired on many point targets—German patrols, vehicles, troops, concentrations, and harassing missions. Squeezed out of this sector in mid-January by the British advance to the Ruhr, it was attached to the 11th Cavalry Group, and moved into position at Linnich, Germany, to relieve the 44th Cavalry Reconnaissance Squadron.

The assault guns went into position about 4,000 yards behind the lines in rear of the village of Ederen, Germany; the same system of coördination with a FA battalion was employed, and the previous experiences duplicated. At times the troop also was assigned the mission of firing on Jerry antiaircraft batteries, and destroyed a number of them and their crews as they fired at Allied planes which were bombing and strafing targets directly in front of the troop's positions.

British-American Contact

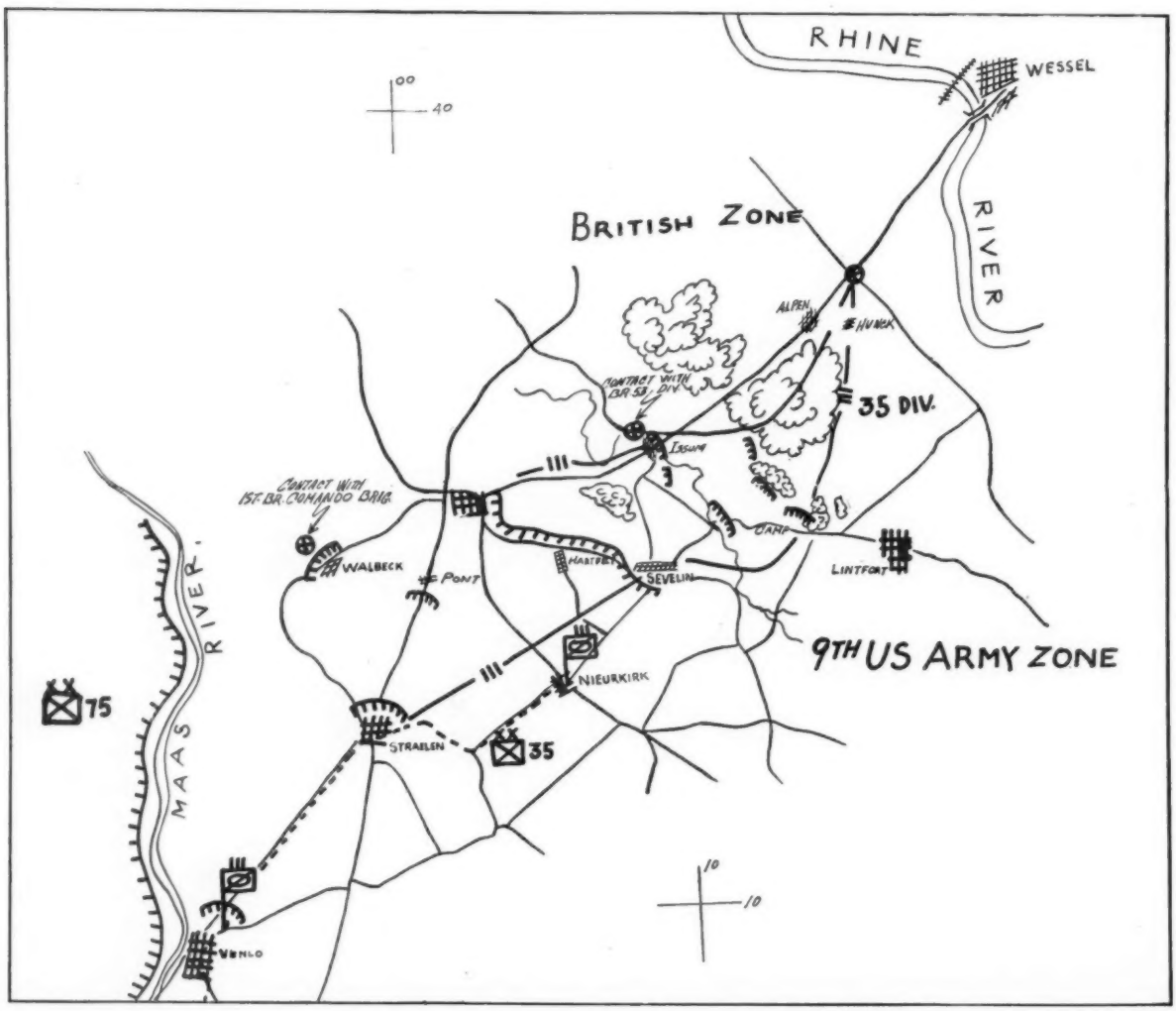
ON March 1, 1945, the 15th Cavalry Group received orders which relieved it from a defensive position on the west bank of the Roer River near Roermond, Holland, and directed it to proceed south to Heinsberg, Germany, then cross the Roer River. The 35th Infantry Division had already crossed the Roer on its way to the Rhine, and the group's mission was to screen the division's left flank, and to link up with the First Canadian Army, which was pushing south from Nijmegan, Holland, between the Roer and Rhine Rivers.

Group Moves Out

The 15th Cavalry Group, led by the 17th Cavalry Reconnaissance Squadron, moved out from Wassenberg, Germany, and headed toward Roermond. The troops entered the city from the east that evening without meeting opposition from the enemy. Since this was a strong part of the Siegfried Line, however, there were many enemy mines on the road, and squadron headquarters and Company F each lost some vehicles.

The 17th Squadron spent the first night just east of Roermond. Patrols were sent out to search for intact bridges across a canal and small stream between Roermond and Venlo, but it was found that in their evacuation from Roermond the Germans had blown down large numbers of trees across the roads and destroyed all bridges between the two cities. The squadron turned east 15 miles where a team of Troop C's 2d Platoon found bridges across the two streams, which were wired with dynamite and small bombs. These were neutralized and the group headed north to Venlo by an extremely devious route through the firebreaks of the forest. It entered Venlo on the evening of March 2 without meeting enemy opposition.

The next morning, still screening the 35th Division's left flank and endeavoring to link up with the Canadians, the group headed northeast toward Geldern, Germany. At Pont, Troop B, leading the 17th Squadron, met heavy opposition. Troop C was ordered to



by-pass to the enemy's right flank, but found the bridges destroyed and returned to help Troop B take Pont.

The 2d Platoon of Troop C, 17th Squadron, in the meantime had entered Walbeck where it established road blocks, and against little resistance captured 11 enemy soldiers and large stores of weapons and ammunition.

The platoon occupied the town, and manned its road blocks during the night of March 3-4.

Armies Link Up

At 0300 on March 4 a large patrol of one officer and 60 men from the First British Commando Brigade walked into the platoon's area. After mutual challenging the patrol leader came forward to identify himself and his men, who had walked from Weil, Holland, a distance of 30 miles, to effect the link-up between the U. S. Ninth Army and the First Canadian Army. After an exchange of notes of military value, the Canadians moved back toward their starting point.

The next day the platoon was relieved by a platoon from Troop B, and rejoined its troop at Straelen, Germany, and later participated in guarding the forward echelon of the U.S. XVI Corps until the corps' headquarters moved across the Rhine River.

After the 15th Cavalry Group crossed the Roer at Heinzburg, the 17th Squadron took the lead in performing the group's mission to screen the left flank of the Ninth Army and establish and maintain contact with the British Second Army.

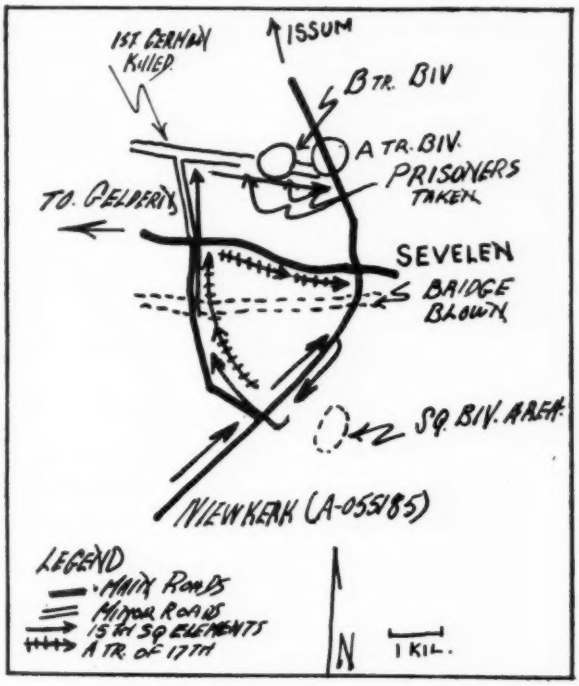
The 15th followed the 17th until it had reached Stadt Straelen, where the 15th was ordered to proceed to Issum. Troop A of the 15th was leading. The route selected was east through Nieukerk toward Sevelen. At 1300, March 2, Troop A was held up half a kilometer south of Sevelen by a blown bridge across a cut. The town had been occupied by elements of the 35th Infantry Division the night before, but the Germans had slipped in and blown the bridge. Tanks of the 35th were along the cut shelling the Germans beyond the town. In midafternoon Troop A of the 17th, advancing from Hartefeld toward Sevelen, met heavy resistance but was able to get a small unit on into Sevelen to contact our infantry.

About 1600 squadron headquarters decided to by-pass Sevelen by crossing a bridge just south of Hartefeld. Troop A was sent out ahead, and at Hartefeld took a minor road into the woods along which the first German was seen crossing a clearing on a bicycle. He was killed.

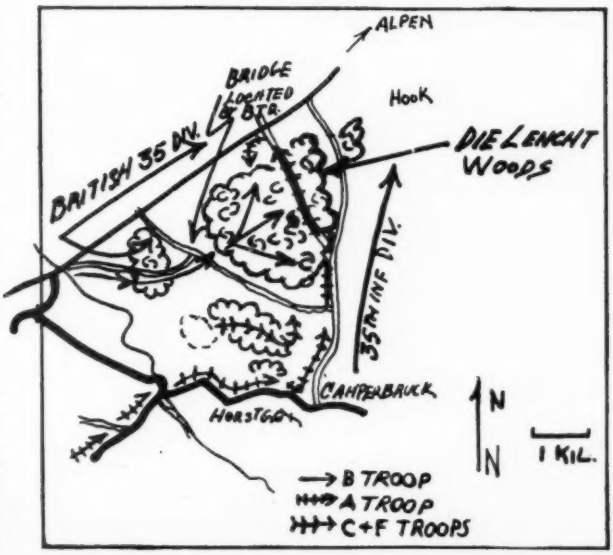
The troop then went east toward the main Sevelen-Issum road 4 kilometers away. It was getting quite dark so the column was closed up. Twice along the road small German parties ran into it before they knew who we were. The first group, armed with a machine gun and panzerfausts, was fired upon by the rear guard and one prisoner taken. The advance guard reached the Sevelen-Issum road about 2400 and bivouacked and informed squadron headquarters near Hoog of the location. Troop B, with a platoon of the 187th Engineers attached, moved into bivouac to reinforce A at 0130. During the blackout drive one bulldozer was overturned.

On the morning of March 3, Troop A moved east and south toward Sevelen in an attempt to contact the 35th Division. Troop B proceeded to Issum in an effort to contact the British. The 2d Platoon went northwest along two minor roads to cut the main Geldern-

First day of action, 15th Squadron.



Third, 4th and 5th days of action.



Issum road. En route it picked up German stragglers. Near the main road the platoon received small-arms fire, and took positions straddling the road.

British Are Contacted

Heavy-tracked vehicles were heard approaching the position about 1100. German snipers in the woods fired in the direction of the sound. This drew tank fire on the 2d Platoon from the approaching British 53d Division. No casualties were caused. The 2d Platoon recognized the friendly troops and were able to identify themselves. This contact, at 1240, was the first that the 15th Squadron had made with the British.

The rest of Troop B had moved north on the Sevelen-Issum highway. The main body plus one platoon of assault guns halted and established positions about one kilometer south of Issum. The 3d Platoon was sent ahead to take Issum. It met small-arms fire and took positions near the bridge across the Nenneper River. At this point two Germans on bicycles came out of an alley and blew up the bridge. The blast killed one of the Germans and knocked Sergeant Smith of the 3d Platoon down. A German self-propelled gun withdrew 500 yards from its position across the river and started shelling the town. Assault gunfire was called for by radio. The assault guns had already been laid on the bridge by map, so it was possible to adjust fire on the self-propelled gun. It withdrew on the fourth round.

The troop consolidated its position and bivouacked in Issum. The next morning Troop A's 1st Platoon was sent south into Sevelen. Its mission was to contact the 35th Division and form liaison with its left elements. The remainder of the troop moved east on a secondary road.

Friendly TDs in position on the outskirts of Sevelen observed the troop approaching a crossroad about one and one-half kilometers east of their bivouac area. Not expecting friendly troops in front of them the TDs opened fire, knocked out one jeep and hit an armored car and another jeep with shrapnel. After the 10th round, Troop A realized that the fire was from a friendly source, and was able to attract the attention of the TDs by the use of yellow smoke and a waving panel. Troop A bivouacked in the vicinity for the night.

About 1000 that same day, Troop C had advanced past Troop A to reconnoiter for crossings over the Nenneper and Fleuvth Rivers. It crossed the Nenneper just west of Horstgen and most of its personnel continued into town and contacted the 35th Division. One platoon was sent north on a small road and encountered heavy fire at the edge of the woods just north of the Fleuvth. Toward evening it withdrew across the Fleuvth, and was joined by the rest of the troop, which bivouacked along the river.

Enemy Is Enveloped

By the next morning, the third day of action for the squadron, the British had built two bridges at Issum. The squadron was to proceed northeast on the main road toward Alpen and Wesel. Troop B crossed the bridge at 0600 and reconnoitered roads to the southeast of the main road. The British were held up by a blown bridge and heavy resistance two kilometers east of Issum. Troop B already had reconnoitered a woods southeast of that point and found a bridge intact. When the information was reported to British Headquarters in Issum, where the 15th Cavalry Squadron Headquarters Forward was also located, the British moved out and effected a right envelopment of the Germans holding them up on the main road. Troop B consolidated its position along the southwest edge of the Die Leucht woods and remained overnight.

That same morning Troop A moved to Horstgen, less its 3d Platoon, which was sent to Camperbruck to reconnoiter for positions which would screen the 35th Division's left flank. Camperbruck was cleared in the afternoon by the 35th Division's tank-infantry team, which then moved into night bivouac on the north edge of the woods. The 3d Platoon of Troop A took a position for the night on the team's left, in a group of buildings that were in an uncleared section of the woods. During the day, Troop C had consolidated its position between B and the 3d Platoon of A.

The next morning Company F and Troop C were given the mission of flushing a small woods just south of the Die Leucht woods. They worked east and contacted the 3d Platoon of Troop A at the south end, without meeting enemy resistance. They also found part of Troop B on the road at the north edge of the wood. Keeping contact with the British on their left, Troop B worked east through the Die Leucht woods. At all times the squadron maintained contact with the British flank brigadier's headquarters through the use of liaison officers and radios.

The 35th Division fought its way north along the east edge of the Die Leucht woods, and the British advanced along the north edge toward Alpon. Both were meeting heavy resistance from stiff delaying actions which were supported by considerable self-propelled gunfire.

The area was becoming quite narrow between the Ninth Army and the First Canadian Army, so the 14th Squadron was relieved of its liaison and screening mission on the left flank of the Ninth. At noon on March 5 Troops B and C assembled at Horstgen, and squadron headquarters and F at Camperbruck. Troop A was attached to the 35th Division to continue the liaison mission with the British.

Finale

Between March 6 and 9, Troop A maintained contact between the British and the left flank of the 35th Division. Progress was slow for the British because they were held up at Alpen. The Germans fought a stiff

delaying action all along the east edge of the Die Leucht woods. Troop A's liaison was particularly useful when the forward elements of the 35th Division were drawing close to the British near Huck and Drupt. During this time radios were kept at both flank battalion level CPs.

On March 9 the Germans were pushed back across the Rhine, but not before they had blown both bridges at Wesel.

A Night Patrol in the Siegfried

by Captain Norman F. Ralston

A NIGHT MISSION to reconnoiter Roermand and its heavily mined approaches for hostile forces had been assigned a task force composed of the 2d Platoon, Troop C; the 2d Platoon, Company F, 15th Cavalry Reconnaissance Squadron; and the 1st Platoon, Company B, 187th Engineers.

Each Unit Assigned Task

Each unit was given a specific task. The 2d Platoon, Troop C, was to reconnoiter the route and provide local security, and the 1st Platoon, Company B, was to clear the road of mines, road blocks, and obstacles. The 2d Platoon, Company F, composed of light tanks, initially was to strengthen the line of departure, and once the mission was under way it was to follow as a reserve and prevent hostile forces from cutting off the patrol from the rear. Also attached was a demolition squad which carried equipment to blow mines or to blast out road blocks.

In supporting positions were one battery of the 691st Field Artillery, one platoon of 4.2-inch mortars, a platoon of assault guns, and a platoon of tank destroyers. All had planned fire concentrations on likely targets. The artillery was directed by a forward observer who accompanied the patrol, the mortars were under squadron control, and the TDs and assault guns under command of Troop C's executive officer. The assault guns were to cover the formation of the patrol with harassing fire, and the TDs were in position to fire on long-range targets or to contest any opposing armor.

It was known that the area had been haphazardly mined with antitank and antipersonnel mines, and that some of the buildings had been booby-trapped. Consequently patrol members were ordered not to go into any building unless opposition came from it. If hostile activity drove the patrol from the road, the leading elements were to clear the ditch and go to the left of the road under the command of the reconnaissance platoon leader. The main body was to do likewise to the right and rear under command of the platoon sergeant. The engineer party was to withdraw to the rear.

Patrol's Order of March

The patrol formed at dusk northeast of Linne and moved out at 2230. The enemy had become strangely quiet. Except for a little harassing mortar fire in the afternoon, he had apparently closed shop. Three scouts preceded the leading patrol elements by 200 yards, one armed with a rifle, two with submachine guns, and each carried a small limber stick which was pushed along in front of him to detect any trip wires across the road.

Following the scouts in staggered formation were three three-man teams of mine sweepers, each composed of an operator, a prober, and a rifleman from the point. Immediately behind the mine sweepers came the remainder of the point, armed with a light machine gun and bazooka. The point was followed closely by a party of 12 markers and mine pullers.

The patrol's main body followed the markers and mine pullers by 200 yards to allow time to mark or pull any scattered mines. The main body was composed of two sections from the reconnaissance platoon and the remainder of the engineer platoon. The engineer party was to clear any obstacles which had been by-passed.

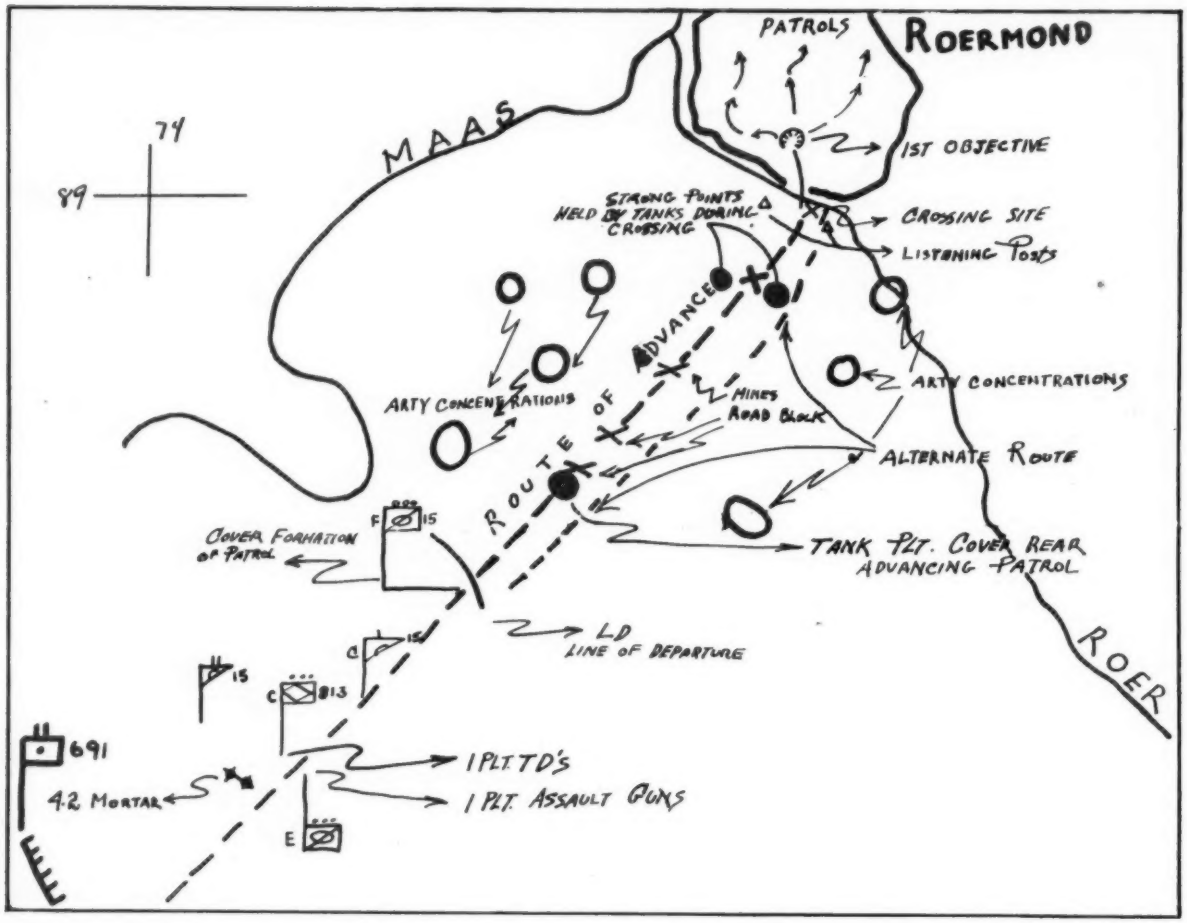
The rear guard followed at 100 yards and was composed of one ¼-ton carrying radio, communication party, and a light machine gun, and a ¼-ton carrying the demolition party with its equipment and a light machine gun. Since support fire was to come from artillery and assault guns, the mortar squad (60mm) formed the rear element.

Mines and dismounted enemy had been cleared from the line of departure the previous afternoon.

As the patrol moved forward the assault guns laid harassing fire in the vicinity of Merum to the left of the route of advance. No obstacles were encountered until the patrol had traveled about 1,000 yards. Here the way was blocked by a well-laid field of Regal mines and debris that had been booby-trapped. The debris was cleared away and a zigzag trail was discovered through the field. No enemy was encountered.

The tank platoon was brought up to this point to cover the north and south roads. The harassing fire ceased and the patrol advanced, leaving a party to clear the road of mines. A small number of mines were found at the crossroads but the patrol's progress was slowed only a few minutes.

The patrol came upon a road block of iron rails, wire,



and a heavily mined area. Scouts were sent out and the area was found undefended, whereupon the engineers and demolition party reduced the obstruction. Numerous and scattered mines and removable road blocks were encountered up to the riverbank.

A small patrol had worked its way through the field, and at 1235 reached the river bank where it set up listening and observation posts. Scouts reconnoitered the river, over which all bridges entering the town had been completely demolished, for a crossing site. At 0215, the main body arrived at the river.

The buildings and high ground were reconnoitered, and strong points of one section each were set up at two points. Another section remained in observation along the river. Only occasional lights were observed on the east side of the town.

After the roads had been cleared, assault boats were brought up. Because of the swift current a crossing site between the highway and the railroad bridge was chosen.

Tanks were moved up to cover the high ground on the south riverbank.

River Is Crossed

Crawling across the river on the debris from the bridge, the first section crossed before dawn. It was to investigate the defenses immediately across the bridge, then continue to a point at which it was to establish holding positions until joined by the remainder of the platoon. The first section reached its objective, and the remaining two sections crossed immediately to join it. Patrols then were sent to north and east sides of the town in which extensive road blocks, mines, booby traps, and damages from the demolitions were found, but no enemy. Civilians reported that enemy troops had cleared out at dusk, en route east.

The patrol withdrew from the town at 1200. The corps commander now knew that the enemy was fleeing from the Siegfried Line.

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The Relief of An Armored Division

by Major Herman M. Marlow

AT 1000, February 27, 1945, the 15th Cavalry Group and its attached squadrons reverted to the direct control of the XVI Corps and was ordered to relieve the 8th Armored Division and establish a defensive line on the west bank of the Roer River.

The relief of the division, which occupied a sector from Vlodrop to Roermond, took place during the night of February 27-28. It was completed by 0010, and by 1200, February 27, the group CP had been established at Echt.

In the group sector the 15th Squadron relieved CCR on the left, and the 17th Squadron relieved CCB on the right. The front line extended from Vlodrop, on the south, to the Meuse River, on the north.

The width of the group's sector, and the size of the unit it relieved, as compared with a cavalry group, made it necessary for each squadron commander to reorganize his assigned sector so that units could be employed effectively.

Disposition of Troops

The reconnaissance troops were employed on the line to establish defensive positions, and the tank companies were held in squadron reserve. In each squadron's sector, the assault gun troops furnished direct supporting fires through the F.D.C. of the supporting artillery, an element of the 8th Armored Division. No other forces were at the disposal of the group.

The front line in the 15th Squadron's sector had not been cleared of enemy to the Roer River, but it was believed that the enemy would soon withdraw across the Roer in order not to be cut off by a task force of the 35th Division, which was spearheading northward to Venlo, east of the Roer.

The enemy was employing a passive defense and using little harassing artillery, consequently the group's thinly held line was sufficient to serve as a screen which could report any attempted enemy reconnaissance and/or offensive action. In positions not actually occupied by troops because of the width of the sector and the terrain, trip flares and patrols were used to cover the front.

The group remained in this sector until relieved to participate in the Ninth Army's operation "Grenade."

Conclusions

A cavalry group which is employed in a defensive rôle, such as has been described, must depend entirely upon the tank companies for its counterattack force because all platoons of the reconnaissance troops are distributed along the front, and there are no reserves to shift. This is a good argument for a three-squadron group. A great deal of unavoidable congestion and noise occurred with this size unit when the relief was effected, and could have resulted in aggressive action, had the enemy been on the alert and offense-minded.

Cavalry Holds A River Line

by Major W. E. Hudson

DURING the final days of March, 1945, elements of the XIX Corps of the Ninth Army crossed the Rhine River and rapidly thrust eastward toward the Elbe River. A deep penetration was thus effected into enemy territory. On the southern flank of this penetration was the enveloped Ruhr pocket; on the northern flank were scattered elements of enemy troops.

Mission

On March 31, the 15th Cavalry Reconnaissance

Squadron was given the mission to seize and hold all crossing over the Lippe River in its assigned zone, and to reconnoiter south of the Lippe River and Canal if the crossings were found to be intact. A secondary mission was to establish a counterreconnaissance screen along the north bank of the Lippe River and prevent enemy infiltration into the squadron zone.

Some 300,000 enemy troops were reported encircled in the Ruhr district immediately south of the Lippe River and Canal. There were portions of many enemy divisions contained in the area, including elements of the 116th Panzer Division, and the enemy was considered capable of pushing north and severing the supply lines of the XIX Corps. The Third and Ninth Armies were progressively tightening their ring of troops around the Ruhr pocket. During these operations the enemy was counterattacking, indicating that he was still organized and that breakouts were desired.

The squadron moved from its bivouac area near Wulfen at 1445 on March 31, and at 1630 entered its assembly area immediately east of Haltern with two troops abreast. Troop B was on the right and Troop C on the left. Troop A, Troop E, and Company F initially were in squadron reserve, moving with the squadron CP through the center of the squadron zone. One platoon of Troop A and one section of Company F were on detached service to higher headquarters and did not participate.

At 1727 the first afternoon, Troop B had reached the Lippe River without encountering enemy resistance, and had established a counterreconnaissance screen in the vicinity of Hasbring, Wiesmann, and Heumann. All bridges within the zone were blown by the enemy to prevent a further advance.

Enemy Contact

In its advance, Troop C made contact with the enemy at 1830, when it met stiff resistance from a wooded area immediately south of Ubbenhagen. One platoon had inadvertently traveled out of its zone and entered the town of Werne on the Lippe River immediately to the left of the squadron zone. As the platoon approached the bridge spanning the river it was blown by the enemy and a sharp fire fight ensued. Later that evening, discovering that it was out of its assigned zone, the platoon gave its information to elements of the 17th Cavalry Reconnaissance Squadron and withdrew into the proper area.

At 2015 the remaining platoons of Troop C, which were pushing deeper into the woods just south of Ubbenhagen, encountered intense enemy fire from panzerfaust and small arms. Inasmuch as darkness was closing in, Troop C was withdrawn to a position just north of the woods. One platoon of Troop A and one from Troop E then were placed under Troop C's control and were utilized to reinforce its positions for the night.

Immediately after the squadron's arrival in its assigned zone, while it was still daylight, Troop A reconnoitered to the flanks and rear and made contact with friendly troops without encountering any enemy.

Mop Up

The following morning at first light Troop C, supported by Troop A, Company F and Troop E, continued the advance on the Lippe River. The enemy that had given opposition the previous night had withdrawn to the river line, which was reached without serious fighting. Small-arms and scattered artillery fire then were received from the south bank of the river, and a counterreconnaissance screen was established in the troop's zone. The remainder of the second day was spent mopping up stragglers, safeguarding enemy equipment and installations and in improving defensive positions.

Troop E took up battery position for indirect fire missions to the left center of the squadron zone, and registered-in its guns preparatory to firing missions south of the Lippe-Canal or laying defensive fires should the enemy attack. Contact to the flanks was established, and late in the afternoon a change in dispositions was made on order from higher headquarters which increased the total squadron front.

The third day was occupied in firming-up all positions, replacing radio communications with telephone, laying defensive action plans, and in general increasing the safety of the entire squadron position.

During the first three days operation, 137 POWs were taken, but only 12 dead were counted. Questioning of prisoners revealed that enemy troops were withdrawing to the Dortmund area.

Operation Concluded

During the remainder of the operation, until April 12, when friendly troops cut across the squadron front south of the Lippe Canal, the operation consisted largely of routine observation, indirect fire missions and blocking of tank approaches. During the latter period an additional 92 POWs were taken, and continued small-arms and artillery fire, including air bursts, were received from enemy positions.

An interesting sidelight on this operation was the delay caused by a small dismounted enemy party at night. Troop C had been held up the first night by dismounted enemy troops armed with panzerfausts and light machine guns. The following morning, with tanks and assault guns, the troop had advanced practically unopposed. The combination of darkness, dense woods and familiarity of terrain had enabled the enemy to hold up the advance of Troop C. In daylight, however, the enemy's position became untenable and he withdrew.

(The End)

Communications in Combat

*by Captain Carl E. Seitz**

THE communications system of the 15th Cavalry Squadron was severely tested in the squadron's great variety of missions as it moved across Europe. Its route was from the beaches of Normandy and the hedgerows of Brittany to the hills and plains of northern France, and then into the mountains of central Europe.

In the hedgerow country of Normandy and Brittany the -506 radio was used as the principal means of communication between troops and squadron headquarters. The size of the squadron zone necessitated the dispersion of its units to such an extent that, over the uneven terrain, the -508 radios would not cover the distance. The -508 served within the unit itself, however, and its simplicity of operation enabled it to be operated by other than trained personnel. This alleviated the terrific strain on the regular, assigned radio operators.

During this campaign, some units of the squadron were assigned dismounted patrol missions, and were handicapped in their communications. SCR-510 radios were dismounted for use on the patrols, but proved quite unsatisfactory because of their bulk. Defects developed from exposure to wet weather, and it became necessary to secure infantry SCR-536 sets. These proved satisfactory, although lack of time and equipment prevented the coördination of the frequencies used.

Relieved of its assignment on the Brittany peninsula, the squadron moved east across northern France and established its CP near Blois. It took over the job of patrolling the Loire River from Auxerre in the east to Nantes in the west, an air-line distance of approximately 240 miles. During this mission, the -506 really proved itself by maintaining contact between the squadron and the CPs of units on patrol, which were located 80 and 90 miles away. A "flat top" antenna was erected, and this seemed to "reach out and get them." A relay station was necessary to reach the units patrolling the most western portion of the river.

When the squadron was assigned the mission of containing the enemy forces in the St. Nazaire pocket, the use of the telephone as a supplementary means of communication was initiated, and soon became the primary means of communication between the immediate units in that area and their platoon outposts. The telephone proved not only convenient and secure, but highly valuable at night when enemy "jamming" made radio communication extremely difficult. Since at this time the squadron TO/E did not provide for wire communication equipment or personnel, it was necessary to borrow telephones, wire, wire-laying equipment and switchboards.

*15th Cavalry Reconnaissance Squadron.

The squadron moved across France, through Belgium, and into Holland to join in the "Push" to the Rhine. From the Roer to the Rhine, on missions such as dismounted reconnaissance patrols, phone communication proved invaluable as the sole means of communication. We were unable to obtain more than a limited amount of wire from supply sources, and all such communication was maintained with improvised and captured German equipment. The improvised material proved highly impractical, but after numerous attempts and considerable waiting we finally acquired an RL-31. Thereafter our wire-laying problems were solved.

During the waiting period, prior to the crossing of the Rhine, the telephone also served to facilitate the making of plans and the maintenance of their secrecy. It is not intended to imply that in general during the latter campaign, the primary medium of communication was by telephone. On the contrary, in most cases the uncertainty of the length of any particular mission, and the rapidity of the squadron's advance made the establishment of wire communication impracticable, and necessitated the continuous use of radio for long intervals. Even when telephone communication had been established and had become the primary means of communication, a continuous listening watch was kept by squadron headquarters on the squadron command net in order to insure continuous contact with the units in case of the failure of the telephone. In some instances, reliefs of units were so effected that the phone lines laid by the infantry were left intact, and required only the attachment of phones to establish communication. Usually, however, the infantry switchboard had been pulled and the lines left untagged prior to the squadron's arrival for the relief. Phone communications to the troops then became a problem. Wire crews would start "trouble shooting" strange lines, and by the time they could "feel out" the line routes the squadron had been assigned another mission and was ready to move forward. When this happened, radio was used.

After the Rhine was crossed, a series of long movements and short stops necessitated the continued use of radio as the principal means of communication. Wire was occasionally used as a supplement. Our assignments carried us into the mountains of central Europe. Here we were given considerable trouble because of dispersion of units, the unfavorable terrain, and the increased interference from enemy "jamming" stations.

Fortunately we did not remain in this mountainous section for any great length of time, but moved to more favorable terrain, where the units were assembled to perform security patrols in a much smaller zone. This was shortly before VE-day, and as the situation became

more static we began the employment of the telephone again. As field wire, a critical item throughout the campaign, had become practically unobtainable, commercial telephone lines were used to a great extent in establishing such communication at this time. By now we had obtained sufficient captured German telephones and switchboards to efficiently maintain wire communication within the squadron, and between the squadron and the group. This equipment proved its value in the following days, during the readjustment and reassignment of personnel within the group.

Recommendations

In summarizing, it seems well to point out the deficiencies noted during our entire operation on the continent, and to offer the following as recommendations for the improvement of communications in a cavalry squadron:

1. Because of the lack of a -506 radio, frequent complications developed in the maintenance of contact between the squadron and its assault gun troop. An addition to the TO/E of a -506 radio, plus personnel to operate it, would eliminate such complications.

2. A reconnaissance troop carries 12 -506 radios with an authorization of 22 radio operators and assistants. The troop communications sergeant can act as one assistant radio operator, but that still leaves one operator without an assistant. An additional two assistants, (CW) radio operators, would alleviate the situation and allow the communications sergeant to properly supervise communications within the troop.

3. A reconnaissance troop equipped with its 35 radios, which presumably is more than is provided by TO/E for other units of its size, needs an additional radio technician to help maintain its sets, and to insure their continued performance in the event of the loss of key personnel. Replacements for such personnel seemed to be unobtainable throughout our entire continental operation. These technicians should be equipped with a ¼-ton truck for transportation, and a ¼-ton trailer for carrying their maintenance equipment and supplies.

4. The squadron radio technician must be one of the most competent men in the squadron; therefore, it is felt that the rating he carries should be a T/3 rather than the T/4 which is authorized. An assistant squadron technician could also be used and the T/4 rating should be given to him. A ¾-ton truck should be provided as a workshop and a means of transportation. It would give the assistant squadron technician a place for repair work during blackout.

5. Taking into consideration the varying degrees to which wire communication was employed by the squadron, and striking an average, the following recommendation is made for TO/E on wire communication equipment and personnel:

(A) Squadron Headquarters:

(1) Wire crew—Wire chief—Rating of Sergeant
Wireman —T/4
Wireman —T/5
Driver —Pfc

(2) Vehicle for wire crew—¾-ton truck

(3) Wire, W-110-B—6 miles (1 mile to run to each troop), (1 mile for CP and repair).

(4) Reel Unit, RL-31—1

(5) Telephones, EE-8-A—7 (1 (CO-EX), 1 (S-3), 1 (-2), (1 Hq. Tr.), 1 (spare), 2 for wire crew test phones).

(6) Switchboard, BD-72—1

(7) Switchboard operators—2 with rating of T/5

Note: The present TO/E authorizes the following:
1 switchboard, BD-71 (6 drop)
5 telephones, EE-8-A
1 RL-27, hand reel for laying wire
3 miles of W-110-B wire on DR-4

(B) Reconnaissance Troop:

(1) Wire crew—Crewman with a rating of T/5
Wire —Crewman with a rating of Pfc.

(2) Vehicle for wire crew transportation and carrying wire crew equipment

(3) Wire, W-130—3 miles (1 mile to reach to each platoon)

(4) CE-11, reel equipment—3 (includes 1, TS-10 handset each)

(5) TS-10, handsets—6 (2 per platoon)

(6) Telephones, EE-8-A—5 (1 (CO), 1 (EX), 1 each platoon)

(7) Switchboard, BD-71—1

(8) Switchboard operators—2 ratings of T/5

Note: Present TO/E is as follows:
1, ½ mile, W-130 wire
3, CE-11, reel equipment
3, TS-10, handsets

(C) Assault Gun Troop, and Tank Company:

(1) Same recommendations as per reconnaissance troop

Note: The present TO/E does not authorize wire communication equipment or personnel for either of the above units.

With the equipment and personnel suggested in the preceding paragraphs, it is felt that a cavalry squadron would be prepared to perform missions of the types it was assigned during the campaigns on the continent.

Members of a tank destroyer unit of the U. S. Ninth Army guarding a roadway in Germany, January 22, 1945.

Signal Corps Photo

The 11th Cavalry Group in a series of actions

The Battle of the Roer

ON December 11, 1944, the 11th Cavalry Group marched out of Holland and into the front lines in Germany. Assigned to the Ninth U. S. Army, and attached to the XIII Corps, the 11th Cavalry's initial combat mission was to relieve the 406th Infantry Regiment of the 102d Division, which was defending an area between Linnich and Lindern, Germany, near the Roer River. Organized and trained for war of movement, the troopers nevertheless adapted themselves so readily to the doughboy rôle that they drew nothing but praise from both division and corps commanders.

On December 12, group and squadron headquarters established CPs in Gereonsweiler. The reconnaissance and tank units parked their vehicles in the rear areas and walked into the line. The assault guns were attached to the 102d Division Artillery for fire missions in direct support of the sector.

Troops on the line during this period came into contact with Nazi propaganda through a loud-speaker which broadcast musical recordings intended to make the Yanks long for home. Propaganda leaflets, sent over in base-ejection artillery shells, had the same intent and bore themes which revealed the depraved, unscrupulous Nazi character.

On December 22 the group was relieved by the 406th Infantry and reassigned a sector just south of Linnich on the Roer River. The CP was established at Setterich, and the 36th was directed to defend the assigned sector and the 44th was placed in mobile division reserve. The assault gun troops were shifted to Ederen and attached to the 252d Field Artillery Battalion for fire missions. On December 23 the group moved its CP to Ederen, and the 44th Squadron relieved elements of the 406th Infantry near Linnich.

Intensive patrolling was again resumed, with the added difficulty of crossing the Roer River each time.

On December 26-27 a patrol, consisting of 18 enlisted men of Troop A, 36th Squadron, and led by Lt. Colonel Candler, Squadron CO, crossed the Roer near Tetz on a footbridge constructed for that purpose by the engineers. Aided by Major Krampitz and Lieutenant Sullivan, Colonel Candler led the patrol toward Tetz until it was pinned down by barbed wire, rifle and burp gun fire. Major Krampitz eliminated the burp gunners by grenades, and the patrol proceeded until broken up by heavy mortar concentrations.

By 2350 the patrol had returned in small groups, except for three officers and three enlisted men. The two field officers, now alone, continued on the mission and ran a 9-mile gauntlet of sentries and groups of Germans to capture a prisoner. While the officers were endeavoring to return, the prisoner fell into the river

and his shouts drew fire from the Germans. Major Krampitz received a flesh wound and the prisoner escaped.

The officers returned at 0150 and at 0245 Colonel Candler again led a platoon across the Roer to rescue the others who were missing. The force met heavy fire. Colonel Candler was wounded and they were forced to return at 0530 without accomplishing their mission.

At this time the great German counteroffensive into Belgium and Luxembourg was nearly two weeks old and with fanatical fury the Nazis had pushed a bulge almost to the French border. Many combat units had been pulled out of the line in static sectors and thrown into the battle to halt the Nazi offensive. This resulted in a considerable thinning of the line in the XIII Corps' sector, and eventually the 11th was occupying the same front originally held by the 102d Division when the group was committed.

In addition to the sector's enlargement, the new year, 1945, brought with it a new directive for harassing the enemy. Plans were immediately instituted to carry it out. A "Commando" platoon, composed of volunteers from all group units, was organized to operate as a combat patrol under the personal direction of the group commander. Dummy tanks were constructed, provisional weapons units were formed, and a scheduled firing of pyrotechnics were all coördinated with other activity of the reserve tank company.

The program got under way early January 2 when Company F of the 36th ran its tanks along the roads of the front, and the provisional .50 caliber machine guns opened up on the enemy position. As expected, this activity drew heavy artillery fire from the Germans, which promptly was neutralized by our counterbattery fire. The dummy tank positions also drew enemy fire.

The program was effectively climaxed on January 6 by the "Commando" platoon in an elaborately planned raid designated as operation "Cleaver." Its objective was the destruction of a troublesome troop shelter from which the enemy launched harassing operations into our sector. Led by two officers, the patrol moved to its forward assembly area after hundreds of rounds of artillery and mortar shells had been poured into the adjacent enemy positions. Covered by a smoke screen, the "Commandos" jumped off at 1630, and quickly achieved their objective before the surprised enemy could open up.

Covered by the rest of the patrol, two men of Company F, 44th Squadron, entered the shelter and placed a 40-pound charge of TNT, which completely destroyed it. After eliminating all enemy resistance near the objective, the patrol withdrew under heavy fire of all types, and narrowly escaped being cut off by the enemy, who had infiltrated behind it.

No detail had been neglected in planning the patrol's operation. One which possibly saved many lives was the foresight which resulted in running a wire line from the 102d Division Artillery fire direction center to the colonel's OP, which was in the attic of a house on the outskirts of Linnich, immediately adjacent to the terrain over which the combat patrol operated. The attack of our combat patrol was the signal for the enemy to fire on Linnich with all their artillery. The artillery FO was heard to tell the fire direction center that his OP was getting too hot and that he was withdrawing. Shells were bracketing the colonel's OP, and one crashed through the attic in which his party was located. Realizing that to withdraw would leave the patrol without artillery support, the colonel ordered the

U. S. Ninth Army engineers build an assault bridge across the Roer in Germany.

Signal Corps Photo

enlisted men to the basement below, and, with Captain (now Major) Brett, Captain (now Major) Todd, and Captain E. C. Jones, 44th Squadron, who refused to retire, the colonel personally acted as FO and directed the fire of the division artillery until completion of the action. The patrol's officers later stated that without the help of our artillery all the patrol would probably have been killed.

On January 13, the 17th Reconnaissance Squadron was attached to the group and was sent into the Linnich sector to relieve the 44th Squadron, which was sent back to a rest camp for maintenance and orientation.

The 36th Squadron, still on the line, continued to conduct aggressive patrolling over the Roer River. On the night of January 16-17, a volunteer patrol of Troop C crossed the Roer, assaulted a strongly defended troop shelter, captured a prisoner, and, after blowing up the shelter, successfully returned with the prisoner. This outstanding success was achieved because careful planning and reconnaissance had been carried out for 72 hours beforehand. (*This is apparently the same patrol operation as described in great detail in the article "Operation Snare," also appearing in this issue.*—EDITOR'S NOTE.)

During this period, the British were attacking steadily in the 21st Army Group's sector immediately to the north in order to extend their lines to the Roer River in preparation for the great spring offensive. From Linnich to the northern boundary of the American XIII Corps' sector, the battle line had not been extended to the river. Consequently, it was necessary for the corps to coördinate an attack with the British drive which would clear the western side of the Roer for use as a springboard in the big drive to come. This attack was designated as operation "Swift" and certain supplementary missions were assigned the 11th Cavalry Group.

A deserter picked up by the 36th on January 25 at 2300, volunteered the information that most of the Germans had retired across the river. Three patrols from the 44th Squadron immediately were sent to verify this information. One of the patrols pushed into the outskirts of Brachelen under sporadic enemy fire, and found that the town was only lightly held by a delaying force.

As a result of the indicated enemy withdrawal, H Hour was advanced from 1000 to 0630, January 26, and the lavish artillery preparation which had been planned was cancelled in order that the dawn attack might be a surprise.

Troop B spearheaded the 36th's attack, with A and C in support, and soon occupied the objective. Heavy fire was immediately received from Gut Rischmuhle and, although it was an infantry objective, Troop C, moving around the left flank, captured it and flushed 23 Germans into the arms of Troop B. The 17th Squadron moved out to occupy its objective and at 0853 the division announced that all objectives had been taken. At 0920, corps announced that the operation had been completely successful.

Operation Snare

*by Captain John E. Newlin**

ON the bitterly cold night of January 17-18, a 30-man combat patrol was to cross the Roer River in a mission known as "Operation Snare," to capture a prisoner for identification and to blow up a troop shelter.

The enemy situation along the front at the time was static. Jerry activity had been limited to small patrols, sniper fire, and intermittent artillery.

PATROL PLANNED IN DETAIL

Since the weather was extremely cold, it was considered essential that all of the men be gotten across without getting wet in order not to impair their efficiency. In order to avoid detection the crossing also had to be made with maximum quiet and reasonable speed.

To determine the best means of crossing, all river characteristics were carefully noted, including the depth, width, current, banks and bottom of the river, and a list made of the methods available—with favorable and unfavorable comments—as follows:

BRIDGE: *Favorable*—men could cross without getting wet. *Unfavorable*—too much time and too many persons required for construction. Too noisy. Too easily knocked out. *Decision*—not practical.

FORD: *Favorable*—quick and noiseless. *Unfavorable*—men would get wet and thus become too cold to work efficiently. Bottom of stream slippery. *Decision*—not practical for the initial crossing, but satisfactory for return trip provided a guide line was employed to help the men hold their feet in the swift current.

BOAT: *Favorable*—quiet and quick. Men would be dry upon reaching other side. *Unfavorable*—river current would make crossing difficult. Drift. *Decision*—if a light boat was used it would be likely to overturn. An engineers' boat would be heavy and require too much personnel to handle. A light rubber boat, therefore, should be used, and instead of using paddles, it should be swung across like a pendulum, using a rope

*Commanding Troop C, 36th Cavalry Reconnaissance Squadron.

tied to the bow of the boat and anchored ashore.

Our patrol had been given the mission 4 days in advance. Two nights before the jump-off, a 4-man reconnaissance patrol crossed the river to definitely locate the enemy positions, and to test the practicability of this method of boat crossing, which had not been tried by this troop. The patrol returned and reported the test to be satisfactory. The enemy positions located were recorded, and a plan of action was drawn up in the minutest detail.

Plan of Operation

Although the actual crossing was to be made by 28 men and two officers, the services of the rest of the troop were required to accomplish the mission. A boat detail of 4 men was to provide transportation, and two 6-man covering forces were to protect the boat party. Once across the river, a two-man team was to proceed upstream and anchor a rope, the loose end of which was to be thrown to a man on the near bank to be secured. The rope was to be used to assist the men across the river when they returned.

A covering party was to take position near the anchored end of the rope on the enemy shore to prevent this route of escape from being cut off. The remaining 23 men and two officers were to go forward and assault the shelter, capture the prisoner, and then blow up the shelter with satchel charges carried by a demolition party.

For several days before the operation, 60mm mortars fired on likely enemy targets, shooting sporadically to simulate random fire. On the night of the operation, one mortar battery laid diversionary fire to the patrol's left flank. Another battery, which had been registered on the patrol's objective, was to fire only on call. The 81mm mortars in the center of the squadron's sector were registered on known enemy positions that might give trouble. The .50 caliber machine guns along our base of fire were sighted-in, and limiting stakes were set.

One section of a footbridge was carried for use in crossing a small creek which adjoined the launching site. Every possible precaution was taken to keep the men's feet dry.

Direct phone communication was provided from the launching site to the FO, mortars, and base of fire by telephone wire which was laid over two widely separated routes. The patrol leader carried a -536 radio, and another was kept with the telephone at the launching site from which the entire operation was to be coordinated. In the event the radio failed and the patrol had to change its route, the patrol leader was to signal back with a flashlight with a lens blacked-out except for a pin-point hole. No code would be needed, as an alternate route had previously been chosen.

All of the patrol members were volunteers. During the two days preceding the operation they were briefed, assigned jobs, and spent every daylight hour studying the terrain. An overlay of all concentrations was memorized since map reference would be difficult at night.

The patrol was scheduled to start crossing in rubber assault boats at 2100, January 17. The night was clear and cold and the ground covered with snow. At 2000, the boat detail arrived at the launching site with rope, boat and the section of bridge for crossing the creek. At the same time the two covering parties went into position on either side of the launching site. At 2100 the white-clad patrol, moving with 5-yard intervals between men, could barely be seen approaching the spot where the boat detail waited for them.

The first three men climbed aboard, and the rope was let out. The boat drifted with the current, its bow upstream, and, upon reaching a bend, was forced by the current against the enemy shore.

The men disembarked, and the boat was pulled back to the near shore. Ten loads were ferried across in little more than 10 minutes. Unaimed fire from burp gunners came through the trees overhead. Our mortars fired TOT about 200 yards downstream.

The patrol crept forward, anchored the rope, and provided a covering guard for it. A German 42 MG opened up to the left of the objective. A .50 from our base of fire sent a stream of red tracers in its direction, and the 42 stopped firing.

Holding its fire, the patrol advanced toward the shelter, which could be seen ahead. It was protected by barbed wire. Just outside the entrance was a trench in which stood a sentinel. Hand grenades were lobbed into the trench, and two men jumped into it and captured a prisoner.

The satchel charges were brought up and passed over the wire, but just before the fuse was lighted three machine guns began firing from a communication trench 100 yards behind the shelter. The fire pinned the men to the ground. Artillery concentration Number 6 whistled overhead. The machine guns ceased firing and the fuse on the satchel charge was lighted.

The patrol withdrew to the place where the rope was anchored and returned with the prisoner through the swift, icy water, holding on to the rope to keep heads above water. The Germans began firing with machine guns, and were answered by our .50s along the base of fire. Enemy artillery opened up, and the FO counterbatteried with TOT close-in to assist the withdrawal.

Conclusion

The operation was successful because the basic principles of patrolling were followed to the letter. Such principles are usually not intentionally or carelessly overlooked; but often they are not carried out because the tactical situation allows insufficient time to fulfill them.

To make a successful night patrol there should be sufficient time: To make a personal reconnaissance; organize a careful plan; select patrol members; brief and allow all personnel to study the ground over which they are to work; and to assemble the equipment.

Sunday Matinee in Germany

A Sunday afternoon horse show was held by the 2d Cavalry Reconnaissance Squadron at Neukirchen, Germany, in mid-1945. It was attended by civilians as well as army personnel. Nine silver loving cups were presented to the winners. Many fine horses and excellent jumpers were rounded up for the show. Also included on the program were foreign-make buggies with flowing, fancy fenders, and an exhibition by daredevil Cossacks.

1. Squadron headquarters.
2. Over a jump.
3. Another high jump.
4. Civilians also attended.
5. Cossacks.
6. Judging troopers' mounts.

Horse Cavalry in the Philippines

*by Major Harold D. Steward**

I HEARD more than one commander in the 1st Cavalry Division remark on the way to Manila, "I would give anything for a squadron of horse cavalry right now . . ."

Horse cavalry, in the opinion of the writer, would have been highly effective in the Luzon campaigns, and especially successful during the 1st Cavalry Division's drive on Manila in early February, 1945.

The mountains and rugged terrain where roads were either nonexistent or difficult would have been ideal for a mounted cavalry division.

During the drive on Manila by the 1st Cavalry Division, only enough transportation was available to motorize two squadrons of the dismounted division which formed the "flying column" that entered the city. The remainder of the division had to walk. The result was that after each day's advance the gap between the advance elements and the supporting elements became wider. With horse cavalry, spearheaded by tanks, this would not have happened.

As the Japs retreated before the 1st Cavalry Division they blew every bridge along the route to Manila. The American advance was held up while these bridges were repaired in order to permit the attack to continue. Bridges would not have been necessary for horse cavalry.

When the two advance squadrons of the 1st Cavalry Division had entered Manila, they were without reinforcements for more than a day. This occurred because the motorized column moved too fast for the elements on foot, and because the Japs had blown the large steel bridge at Novoliches which made it necessary to build a by-pass for the supporting elements.

Throughout the war in the Pacific, the Japs have used piecemeal attacks, which usually employed one or two companies of infantry, and never more than a battalion. Horse cavalry, which is an arm of speed, could easily have outflanked the Japs when they used such tactics. It could have rapidly brought heavy machine guns and artillery pieces into action on the flanks and in the rear of the enemy. In areas where there were no roads such tactics were impossible for the motorized units, and the foot soldier was incapable of carrying heavy artillery on his back. The surprise from an attack by trained horse cavalry would have resulted in many instances in a Jap rout.

During the fighting in the western mountains of Leyte, the 1st Cavalry Division recruited local horses to be used in pack trains for transporting supplies and equipment to combat troops high in the rugged hills. The answer here would have been pack trains of army mules. Because there were no mules and not enough horses, most of the supplies were carried through the mountains by soldier-pack carriers. The use of combat personnel as pack carriers not only reduced the fighting strength of the division, but also limited the quantity of supplies that could be carried to the troops who were in action.

*Former 1st Cavalry Division Officer.

Samurai Swords Commemorate Cavalry Heroes

SIXTEEN historic Samurai swords, for centuries the emblems of Japan's now vanquished military might, are to become a part of U. S. Army traditions. They will be used by the 8th Regiment of the 1st Cavalry Division to establish a new ceremony for the passing of command in its units. The swords were surrendered to the regiment by Japanese military commanders when the 1st Cavalry Division occupied Tokyo.

The new ceremony is designed to keep alive the memory of regimental heroes and those who gave their lives on the long march across the Pacific to Tokyo, and to retell the story of the organization's bloody progress for the benefit of succeeding generations of men serving with the outfit.

A sword bearing the name of a hero from the unit has been presented to each squadron and troop commander of the regiment. Each sword will be known by the name of the officer or enlisted man to whom it is dedicated.

When a commander of a unit is relieved from duty, an appropriate regimental ceremony will be held at which he will present the sword to his successor as a symbol of command. At the ceremony, a brief account of the exploits or death of the man to whom it is dedicated will be read by the regimental adjutant.

"Through this custom, the officers now living, who fought beside those who bled and died, hope to perpetuate their memories and thus hand down to succeeding generations some of the bloody memories and a bit of the glory that was the 8th Cavalry's during those historic days in the Pacific," Colonel W. J. Bradley, commander of the 8th Cavalry Regiment, said in announcing the new ceremonial.

Jungle Pack Operation

Time, Inc.

Route of the 5307th Regiment into India and Burma led through heavy, wet jungles, mountain ranges and rivers.

From February 1 to June 1, 1944, the 5307th Provisional Infantry Regiment, a part of Merrill's Marauders, marched 700 miles through the jungle terrain of India and Burma. Heavy weapons and radios, and supplies from air drops were transported by pack animals.

THE 5307th Provisional Infantry Regiment inflicted several thousand casualties upon the Japanese during its campaign in India and Burma. The general plan was to aid the Chinese troops in securing as much room as possible for the Ledo Road. The tactical plan of the Marauders was to operate in the enemy's rear, sever his lines of communication, and force him to attack over ground chosen by the Marauders in order to restore his supply route. This strategy in coordination with the Chinese offensive brought defeat to the Japanese in that section of Burma, and eventually resulted in the fall of Myitkyina.

Organization and Training

The 5307th was a provisional infantry regiment which was organized for a specific type of mission on a special T/O and E. It was based on the "column"—a tactical grouping of weapons and personnel developed by General Ord Wingate for his raid into Burma in 1943. As finally modified and developed the regiment included a regimental headquarters and headquarters company, three battalions, and two quartermaster pack troops whose animals and personnel were divided among the three battalions.

Each combat team contained an infantry company, a reconnaissance platoon, a pioneer and demolition platoon, and a weapons platoon. Heavy weapons, radios, and supplies were to be transported by pack animals, and the regiment was to be supplied by air.

Prior to the opening of the campaign, the 5307th trained intensively for a short time. Although most of the men were seasoned soldiers, they had not worked together as a unit; nor had they been trained in animal care and management, or in pack transport upon which the unit was dependent to maintain a supply level between air drops.

The regiment began training in November, 1943, but various factors forced its employment in combat before it normally would have been committed. It marched down the Ledo Road on February 1, 1944, to begin a 6-month period of almost constant action or movement. *The deficiencies resulting from insufficient training with the pack animals became apparent at once, and constituted a serious handicap to the unit during the campaign.*

Animals

Horses: On January 1, the 5307th received its initial contingent of 700 pack animals, which were recognized as part of the 112th Cavalry mounts from the previous year in New Caledonia. Their condition had declined greatly, but 140 of the best animals were chosen for the 5307th. Two weeks later 200 more horses were obtained from the same source.

There was little time to train and condition the 340 animals. An unknown number had been used as weapons pack animals. It was necessary to break the majority of the animals a second time, however, as they had not been used in many months.

Under normal circumstances, a training program would have been initiated to improve the condition of the animals, train them to willingly accept and march under packsaddle and load, and fit and adjust their individual pack equipment. Because of the exigencies of the situation, such training could not be accomplished. The animals were groomed, fed, and shod, and a few short marches were undertaken which dem-

onstrated their poor condition and the lack of animal training on the part of their infantrymen handlers.

Packsaddles, pads and accessory equipment could not be adjusted until the march down the Ledo Road began, when many of the men led their particular pack animal for the first time. A number of the packsaddles, which were on the animals' backs for the first time, did not fit, and nearly every animal in the regiment developed a sore back. The men were untrained in preventative measures and knew nothing about "chambering" a saddle pad to immobilize a sore back to permit it to heal and consequently the sores grew continually worse.

The poor condition of the horses at the beginning of the campaign, and the lack of care due to inadequately trained animal personnel, resulted in excessive non-battle casualties. During the campaign the horses steadily lost condition and weight. Most of them died from exhaustion, were destroyed, or killed by enemy fire.

Mules: The 360 mules in the regiment had been trained as pack animals in the States, and were employed with far greater success than the horses. Casualties among them were not excessive. The personnel had been adequately trained, and although the animals were out of condition after the long voyage from the States, the mules actually gained in condition during the opening phase of the campaign. Their average weight had declined at the end of the 700-mile march, but a short rest would have restored most of the animals to a normal condition. The value of the previous training was reflected in the fact that, of the 700 animals which began the campaign, nearly all of the 250 animals which survived it were mules.

Equipment

The versatility of the Marauders in the employment of their weapons was a factor which contributed largely to their success.

Weapons favored in jungle warfare—where heavy fire fights often occurred at a range of from 40 to 10 yards—were the Thompson submachine gun, the .30 carbine, the M1, the BAR, mortars, grenades, and light and heavy machine guns.

Lack of artillery support was keenly felt during the initial stages of the campaign, and 75mm pack howitzers finally were requested and obtained by air drop. They proved to be excellent weapons for jungle employment and added considerable punch to the Marauders' offensive operations.

Animal Equipment

Standard animal and pack equipment was used and proved satisfactory. The Phillips cargo saddle was used on the mules, and the *"China Special"* on the horses. The China Special was considered unsatisfactory because it was too small and could not be made to fit. Riding animals were equipped with the McClellan saddle, or the standard packer's riding saddle, full-rigged. Standard adapters and hangers also were used for weapons loads. It was necessary, however, to design and construct hangers and adapters for transporting radios by pack. Animal equipment satisfactorily withstood the hard wear of the campaign. Considerable equipment was lost, destroyed, or abandoned when the animals carrying it became casualties, but that which remained at the end of the campaign was still serviceable and required only cleaning and repairs to restore it.

Mule skinners of the Mars Task Force, operating on a similar mission, lead mules through a river enroute to Bhamo.
Signal Corps Photo

Signal Corps Photo

Soldiers lead pack mules through a trench up a 1,200-foot slope to a supply dump. Note plane in upper left corner.

Feed and Forage

General: The regiment depended entirely upon air supply for food, ammunition, and other supplies of all types, including grain rations. Grain was dropped free (without cargo parachutes). The system was dependable, and with few exceptions grain rations were always available for the animals. Near the close of the campaign one combat team missed an air drop. Its animals, already in poor condition, were without grain for 5 days and began to collapse from exhaustion. Even this single mishap was not due to failure of the air supply system.

Grain: Grain rations were drawn from the British and consisted of 8 to 10 pounds of a half-and-half barley and gram (also called "chick" peas) mixture. The gram, when crushed, resembled ground peas. This ration was adequate.

Forage: Until the regiment left the Ledo Road, hay and grain could be drawn from near-by units. One outfit even had a small stock of alfalfa which it shared with the Marauders. Prairie hay also was available occasionally, but it ordinarily had been chopped fine and compressed into small bales. In feeding it was necessary to spread it on the ground which resulted in excessive waste.

Green Forage: Plenty of green forage was available along the 700-mile route of the 5307th. It was of sufficient quality to add the required bulk to the animal diet. Both horses and mules developed a great liking for green bamboo tops. The men cut them and the animals ate all they could get.

Packing: Only a few more than 200 men in the regiment were trained in the techniques of pack transportation and animal management. They were largely responsible for the successful employment of the 700 pack and riding animals. Since in the jungle it was a full-time assignment for one man to be responsible for one animal, it was necessary to detail infantrymen as mule skinners. Experience was a hard teacher but, as the weeks passed, doughboys learned to tie lash ropes with knots that would not work loose and to pack loads which would stay on the saddle. They gradually came to understand their animals, their individual characteristics, capabilities, and limitations.

Packmaster: The duties of packmasters were heavy and manifold, particularly at the beginning of the campaign. During the march, packmasters moved up and down the column to check the lashing and balance of loads, and the fit and adjustment of equipment. It often was necessary to lead an animal off the trail, unload his cargo, adjust the saddle equipment to prevent a sore back, and replace the load. The doughboys attended pack school beside the trail as packmasters explained the adjustment of a saddle pad or demonstrated how to balance and lash a particular type of load. When bivouac was established at night, the packmasters' working day continued. Saddles were adjusted, pads were fitted, and equipment was swapped from one animal to another in order to achieve a proper fit. Another nightly task was to chamber the pads to facilitate healing of the numerous sore backs. The packmaster also supervised the care of the animals, and since the doughboys were unfamiliar with such details, a considerable amount of persuasion, instruction, and demonstration was required to convince a trail-weary infantryman that it was necessary to feed, water, and groom the animals and examine their feet prior to opening his own rations. The packmaster's duties became somewhat less stringent as the campaign progressed and the inexperienced packers became familiar with their duties.

Cargador: The duties of the cargadors were equal to those of the packmasters. Each night, they supervised the unpacking and stacking of cargo and equipment, and planned the assignments of cargo for the next day's march. The cargadors also acted as saddlers, and repaired broken animal equipment. Each morning when the cargo was packed, they assigned loads to individual animals and supervised the preparation, loading, and lashing of the cargo. The cargador also assumed the duties of the packmaster during the latter's absence.

Loads: Hanger loads consisted of weapons, radios, and ammunition. General cargo loads were made up of ammunition, rations, medical and other supplies. In addition, each animal also carried his own grain ration. Loads for horses weighed 150 to 200 pounds, for mules from 200 to 275 pounds. The lower weight was preferred.

Marches: On marches there was no pack train in the usual sense. Normal provisions were made for security, communication, and control, and these were adapted to meet whatever circumstances were imposed by terrain and the situation. Pack animals were as much a part of the platoons as the weapons and supplies they carried. A man was assigned to lead each animal since it was not practicable to attempt herding. Neither was it possible to tie two or more animals' heads and tails together, for they invariably became tangled in the heavy undergrowth.

Terrain: The terrain traversed during the 6-month

campaign often was difficult, and demands were severe upon the physical strength of man and animal. The topography included rivers, swamps, and 6,000-foot mountains. After April, the outfit seldom was dry and was seldom out of the mud. Animals frequently bogged down and it became necessary to unload the cargo, remove the saddle, and haul them out bodily. Consequently, the rate of march was variable. It was almost impossible to conform to a schedule, and distance was customarily estimated by time rather than miles.

Jungles: The Burmese jungle was of three general types. Virgin growth, or "primary jungle," consisted of giant trees and thick undergrowth through which it was necessary to cut trails. Visibility often was less than 10 feet and sunlight seldom touched the ground. Secondary jungle was less thick, and only an occasional vine had to be cut to clear a trail. Clearings (savannahs) were not infrequent and there were occasional patches of sunlight on the ground. Marshes were encountered along the rivers. Many of them were, for practical purposes, impenetrable to man or beast and had to be by-passed. Jungles of all types were generally heavier in the valleys, thinned out on the ridges, and sometimes opened into areas of tall grass. Rainfall, which was relatively light during the earlier part of the campaign, became excessive after May 1. The Marauders seldom were completely dry thereafter until Myitkyina was taken. Contrary to expectations, they saw but few animals and occasionally a snake, but insects and leeches were a constant nuisance.

Mountains: The mountains constituted almost impassable obstacles. Men and animals were frequently injured when they fell down steep grades. Making a passable trail for animals meant grueling labor. Often it was necessary to dig trails in steep shoulders, and to cut steps to aid the animals in climbing. Men placed their shoulders to the rumps and bellies of the animals and pushed and heaved to help them take another step. The men were amazed at the agility of the mules, who were able to make their way where men had to use their hands to climb. In such terrain, it was essential that the work of the preliminary trail reconnaissance party be coördinated with that of the pioneer parties in order that trail improvement could be made ahead of the moving column.

Bivouacs: The Marauders habitually established their bivouac as a perimeter defensive position. While preparations for the night's bivouac were in progress, packers unloaded cargo and stacked it under cover. They then left the picket line, at which a guard remained, and put up their shelters for the night. Packsaddles were left on the animals during this period so that circulation would gradually return to the pressurized areas of their backs. The men then returned to the picket line, removed the packs, watered and fed the animals, and groomed them if darkness did not intervene. If circumstances prevented grooming at night, the animals were groomed the next morning. During this period the packmaster examined the animals and sent those requiring attention to the veterinary officer.

Lessons Learned

1. Troops who participate in jungle warfare must be in top physical condition. Otherwise, the hard physical work and the damp heat will soon wear the men to the point of exhaustion.

2. As it is conducted in the United States, training in animal management and the technique of pack transportation is sound. High animal losses during the Marauders' campaign were due, not to a lack of training doctrine, but to a lack of training and lack of time to condition animals.

3. Pack operations in the jungle are entirely feasible if:

   a. Men and animals are in top physical condition.
   b. Packers are thoroughly familiar with the technique of pack transportation and animal management.
   c. Equipment is correctly adjusted to individual animals.
   d. The unit which is being supported by pack transportation plans its operations with due consideration for the capabilities and limitations of its accompanying pack train.

4. Infantry units which employ pack transportation should train with pack animals. Unless this is done, the animals will not become properly conditioned nor will the troops become accustomed to including the animals in the scheme of operations. More than a few men should be experienced with animals. All men in charge of animals must be fully trained in their care and management, and indoctrinated with the necessity for giving them the best possible care under all conditions. Infantry officers in command of such units must have a thorough understanding of animal care.

5. The Phillips cargo saddle is too heavy, although it is excellent in all other respects. In rough terrain, breast collars are necessary and, where feasible, hangers should be provided for all standard loads so that the weight may easily be taken off the animal's back at short and indefinite halts.

6. Any change from hay to green forage should take place gradually to avoid diarrhea. Bamboo leaves are an excellent green forage.

7. Animals should be clipped prior to operations in hot climates. An adequate supply of pine tar should be kept on hand for treatment of open wounds and cuts, to prevent the entry of screwworms.

8. A combination of air supply and pack transportation is an excellent means of supplying rapidly moving troops. Packages of rations, medical supplies, and other items are of ideal size and weight to load on pack animals without further preparation.

Outguessing the Enemy*

by Captain W. H. Whyte, Jr.

In the fog of war, we seldom know enough about the enemy. We must not fool ourselves that we can guess what he will do, but stick to learning his "capabilities."

THE Japanese General, as he pored over maps in his Bougainville headquarters, was a very puzzled man. He was sure the Americans' next move would be a landing on Bougainville. The big question was where. In view of the tremendous stretch of vulnerable coast line this was quite an order for any G-2, but he was up to it. After a thorough study of terrain, hydrography and his past (and disastrous) experience with the Americans, he decided that the landing would undoubtedly be made at Gazelle Bay on the west coast.

His men feverishly prepared beach defenses and strengthened their Gazelle Bay garrison to meet this expected invasion. It is more than possible that one day an excited runner rushed into headquarters with an American officer's dispatch case which had been found in the bush along the coast southeast of Gazelle Bay. The Yankees had obviously been reconnoitering the area! As the writing in the officer's notebook was translated, we can imagine the "I told you so" smirks that came over the Japs' faces, for the American had stupidly jotted down his orders—orders to patrol the area to determine the best landing beaches.

But when the landing came, it was at Torokina, 15 miles to the north in an area lightly defended. However, the Jap commander was not this easily fooled—the Torokina landing was obviously a most clever diversionary move, so he kept his men at Gazelle Bay in readiness for the main landing.

As we know, it was never to come off, for, as had been planned all the time, the 1st Marine Amphibious Corps poured everything into Torokina. The captured notebook with the Gazelle Bay landing plan? It was prepared by the Marine G-2 and deliberately left behind by the amphibious patrol for the Japs to find. Actually, we cannot be sure that it was retrieved by the enemy, but we can be sure the Japs' belief that they had correctly divined our intentions cost them dearly.

Human nature being what it is, rare is the person who doesn't secretly feel himself endowed with a profound perception of other people, with instinctively correct hunches as to their probable behavior in a given set of circumstances. True, some of our predictions may have gone wrong, and we may have lost an election bet or two, but they were "exceptions." Thus, confronted with a rather foggy situation in which we, as platoon leader or division G-2, should make an estimate of the enemy, our natural instinct would be to avoid the routine job of objectively reviewing all our information and going to work with a map and a pair of dividers. It would be so much easier to put ourselves into the enemy's shoes to determine his probable intentions.

The Japs on Bougainville tried it and failed. In an even larger sense their fateful and now much-regretted decision to launch the Pearl Harbor attack was the result of paying too much attention to what the "decadent" Americans probably *would* do, and too little to what they *could* do. The German General Staff, if they get the opportunity to compile a manual of their mistakes in this war for future reference, might say "Amen" to this.

One might reply that the Germans and Japs, and often ourselves, simply made bad guesses—poor applications of a perfectly sound principle. What, then, is wrong with the theory of "intentions?"

In estimating intentions we're starting out on a line of deductive reasoning. On the basis of incomplete information we arrive at a premise—i.e., "The enemy always attacks over the worst terrain." Then we continue our deductive reasoning by applying this premise to individual cases; i.e., "Gongo Swamp is the worst terrain around; therefore the enemy will attack through Gongo Swamp." However, in deduction, our conclusion is valid only if the premise is absolutely correct. If it isn't we're liable to be in hot water.

Because we realize that in the fog of war we rarely know enough about the enemy to justify making sweeping generalities and premises that will hold true in all cases, we prefer the method of inductive reasoning, the method by which we let the facts point to the conclusions rather than taking a conclusion and finding facts to support it.

We go even further in admitting our shortcomings, for we know that in inductive reasoning the conclusions are only probable, the extent of probability depending

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*Courtesy, *Marine Corps Gazette*, November, 1945.

on the amount of facts we have. Thus, in making our estimate of the enemy situation, we don't fool ourselves that we can determine what he will do, but more modestly stick to finding out which is the most probable of the things he *can* do. This is the system of "capabilities."

With what information we have of the enemy and the terrain, we consider what general courses of action he could physically carry out, however stupid or tactically unsound they might seem. Some of these courses wouldn't hurt us in the least, and might be just what we want him to do. While we are naturally curious about anything the enemy may be up to, first things come first, so we concentrate our attention on those of his courses which, if adopted, would interfere with the accomplishment of our mission, these being classed as his "capabilities."

As an example, let us take over the job of the S-2 of the battalion which has just arrived at 1400 in Buzu Woods, as shown in the drawing on this page. Our mission is to seize Mugo Ridge, currently occupied by what appears to be a company of unreconstructed Japs. H-hour has been set at 0800 tomorrow. What are the enemy's capabilities?

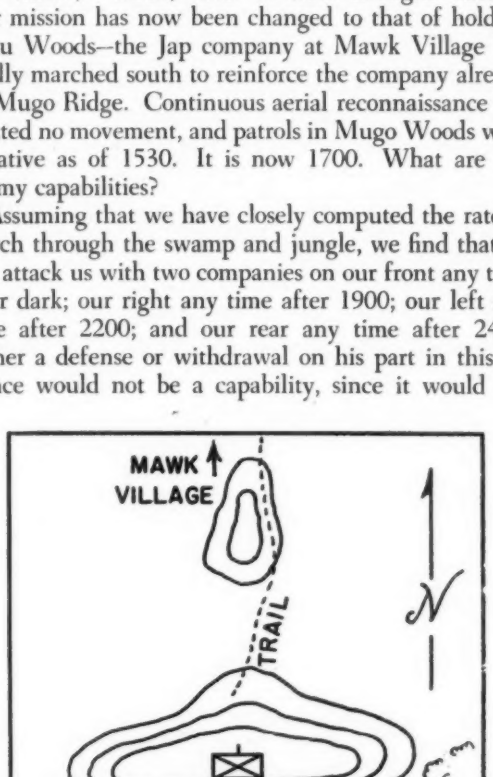
If he withdrew, we would be delighted. Such fortuitous action on his part would not hinder our job at all, so it is not a capability, although it would quickly become one if regiment told us to "destroy" that particular group of Japs. They can chiefly hinder our mission by defending the ridge. This is the obvious capability, and many would feel it the only one. But although they are not supposed to, since we are all set to attack, they *could* stage an attack of their own. Illogical as it might seem, it is a capability, just as was that of a German attack against our forces in the Ardennes sector last December.

If there were another company of Japs at Mawk Village to the north, we would add the capability of their reinforcing the unit now on Mugo Ridge. We would not qualify each capability according to a possible reinforcement build-up, for that would run into a regular geometric progression, but would state it as a separate capability common to the others.

So far we have examined the "what," but we must also consider the "where," and "when," and the "in what strength"—and this is where the trouble begins. The G-3, in making his time and space calculations for our own operations, includes reasonable allowances for all time-consuming factors such as the transmission of orders, reconnaissance and so on. Time and space calculations on the enemy, however, must be based on assumptions of complete preparedness, maximum speed and perfect operational efficiency. At the beginning of the war with Japan we tended to go a bit overboard on this and credited the Japs with being pocket-sized supermen, their transports of limitless capacity, and rough terrain their first love. We soon learned, however, that the Nip was no better with the machete than we. By the end of the war we could estimate rather closely the time and space factor of his capabilities. To overestimate the enemy, while perhaps not as dangerous as underestimating him, is to rob ourselves of many chances for quick and decisive action.

To get back to Mugo Ridge, let us continue the situation, keeping in mind the importance of determining the "where," "when," and "in what strength" factors. Our mission has now been changed to that of holding Buzu Woods—the Jap company at Mawk Village has finally marched south to reinforce the company already on Mugo Ridge. Continuous aerial reconnaissance has spotted no movement, and patrols in Mugo Woods were negative as of 1530. It is now 1700. What are the enemy capabilities?

Assuming that we have closely computed the rate of march through the swamp and jungle, we find that he can attack us with two companies on our front any time after dark; our right any time after 1900; our left any time after 2200; and our rear any time after 2400. Either a defense or withdrawal on his part in this instance would not be a capability, since it would not



What are the Japanese capabilities here?

interfere in any manner whatsoever with our mission.

But, you might say, is that all he could do? Could he not attack our left with a platoon, hit our front with another, and then envelop our right rear with the bulk of his force? Or couldn't he feint on our right with two platoons and launch his main attack straight across the river . . . or a feint on our left . . . and so on, ad infinitum?

Since the variations of the enemy's main capabilities are endless (not going beneath platoons in this instance, since there are over 200 "sub-capabilities") it is obvious that to go into the ramifications of each general course would be an impossible task. Accordingly, we concern ourselves chiefly with what the enemy will do with his *main body*.

Now let us take the same situation and examine it through the eyes of the one who believes in "outguessing" the enemy—of trying to determine his intentions. The battalion S-2, being a modest fellow, admits that while he knows what the Nips can do, he does not know what they *will* do in the next 24 hours. At the CP is Captain Hotshot, "an old Jap fighter," who has no doubts whatsoever that he can dope out what the enemy is up to by the simple process of placing himself in the enemy's shoes. "Easy, Lieutenant—so I'm over there on that ridge. I've got two companies. The Americans have a battalion. I've got a swell defensive set-up—good high ground—grazing fire to my front, as well as a river. There's a swamp protecting my right flank . . . I've got a swell route of withdrawal if things get too hot—couple of good spots for a delaying position between the ridge and Mawk Village. By defending I've got everything to gain and nothing to lose. If I attack a battalion with two companies, I'm crazy. And let me tell you something, Lieutenant, I know these Nips pretty well, and they're not crazy. Take it from me, those babies are going to sit on that ridge."

Captain Hotshot, rather pleased at this searching analysis of the situation, is temporarily discomfited by the sudden appearance of Sergeant Jones, just back from patrolling Mugo Woods. The sergeant's patrol had run into a group of Japs hacking a large trail up to the banks of Buzu River. By cross-examination, however, Captain Hotshot finds that the Japs were jabbering away merrily when the patrol spotted them! "Simple! Plain as the nose on your face—they were staging a demonstration to make us think an attack is coming up—the fact that they were making so much noise gives 'em dead away." Here Captain Hotshot permits himself a patronizing chuckle. "Well, that might fool some people, but they'not not fooling this bird. I know what makes these Nips tick."

Fortunately, since this is a hypothetical case, we can actually find out what is going on over there on Mugo Ridge. For one thing, Captain Ichimura, a first class officer, was killed this afternoon by a mortar shell, and the company commander of the outfit, just arrived from Mawk Village, is 1st Lieutenant Sugiyama, a fireball of limited intelligence. Yesterday afternoon he was severely reprimanded by the battalion commander for his company's being the worst in the battalion, so Sugiyama is naturally anxious to redeem his good name as well as the company's. On the basis of reports from patrols and observation posts, he estimates the strength of the Americans on the other side of the river to be approximately a reinforced company. It does not give him much margin of superiority, but as he is an unusually skillful tactician, and as one Jap is worth 10 Yankees, he knows he can annihilate them. Accordingly, he has sent out a trail-blazing patrol to prepare the way for a forced night march to turn the enemy's right flank after which one good banzai charge will do the trick.

Far fetched?

Delve into the background of any Japanese campaign in the past war and you will find that they, like ourselves, often made plans on the basis of inaccurate information, improper evalution, poor terrain analyses, and these plans, good or bad, were changed at the very last minute. So how in the world, with even the best of information, can we tell what the enemy is going to do when frequently he does not even know himself?

At the battle of Frederickburg, Lee was about to deliver on Burnside's badly disposed Union forces an attack which gave every promise of success. Just then he was given an order of Burnside's that had been captured—an order which revealed Burnside was planning to attack the next morning. Stonewall Jackson was all for attacking immediately, but Lee decided, on the basis of this document, to postpone the attack and lay a trap that would catch Burnside when he ventured forth the next morning. As luck would have it, Burnside changed his mind and withdrew, thus robbing Lee of what perhaps had been his best opportunity to destroy the main Union army.

Lee, of course, was taking a justifiable military gamble in postponing his attack, but it is an illustration of how impossible it is, even under the best of circumstances—such as the capture of the enemy's plan—to determine ahead of time exactly what the enemy *will* do.

In this connection we should avoid deducing the enemy's mission, for it is simply another way of estimating "intentions." The Japs, having "G-2d" the marines' Bougainville beaches with a conspicuous lack of success, apparently still believed themselves up to reading our minds, for they decided that the U. S. mission was to conquer the entire island. Thus, while the marine beachhead was being consolidated, they refrained from attacking it with any sizable force, but rather strengthened the defenses of the island's various garrisons. When it later became evident that the marine mission had been to establish a perimeter to defend newly constructed airfields, the Japs mounted a full scale attack, but too late to have any real chance of success against the perimeter, now well dug in.

Obviously no commander is greatly helped in making a decision by a mere list of what the enemy *can* do. In calculating his best course the commander wants to know what is the most probable enemy capability. In determining this priority, the primary consideration is the disposition of the enemy forces—which course is he best located to carry out? In the case of the Japs on Mugo Ridge, if our reconnaissance indicated that the bulk of the force had moved to Mugo Woods during the night, we would be justified in listing an attack on our right as the most probable. True, it might be a feint, but if we get too subtle about it we could never determine anything.

The biggest pitfall in estimating probability is to analyze the terrain to determine which course it favors most. The fallacy of this reasoning lies in the fact that the enemy, in making his dispositions, has *already* made his terrain analysis. Our terrain analysis might be better, but he is placing his troops on the basis of *his* evaluation, not *ours*. That is the reason why, in estimating the probable order of the capabilities, we are guided primarily by the enemy's dispositions rather than by the terrain.

Dispositions are the basic consideration in estimating priority of capabilities, but there are 4 other factors that can influence our choice of the most probable enemy course. These are: the enemy's tactical doctrine, his recent performances, national psychology, and the character of the hostile commander.

Among the armies of the world, Field Service Regulations vary little, lip service being paid to all of the standard tactical principles. Past enemy performances, however, reveal which of these principles the enemy customarily puts most emphasis on, and which of them he honors in the breach. In respect to the Japs we found that despite their Staff Manual's warnings against uncoördinated offenses, piecemeal attacks were the rule rather than the exception.

The national psychology of the enemy nation frequently may point to an indication of priority. Intelligence officers early learned that they could often expect a full-blown banzai charge on the anniversary of the Emperor, Meiji, even when the situation called for considerable Nip circumspection.

In like manner our intelligence agencies must constantly be striving to learn as much as possible of the character of the officers of the armies of the world. The obscure second lieutenant of today may be the general opposing us tomorrow. Is he rash? Is he cautious? Does he love a good party . . . liquor? Patient detail work now may provide one of our future commanders with character analyses that will help him keep one jump ahead of the enemy. George Washington, one of the most intelligence-minded of all our military leaders, was always anxious to find out as much as possible of the character of his opponents. His awareness of Lord Howe's dilatory ways enabled him to escape defeat more than once when they met in the field. In using these 5 factors affecting the priority of enemy capabilities, the big temptation is to slight dispositions, develop a "pet theory" as to what the enemy *will* do, and then rationalize it on the basis of tactical doctrine, psychology and so on. This form of reasoning becomes, in effect, that of "intentions." We must remember that the basic consideration in determining the most probable capability is the known disposition of the enemy; in other words, which course is he best disposed to carry out?

To sum up: on the basis of the last known enemy situation we consider all those courses of action of which he is physically capable, examine them in the light of our mission, and class those which would interfere with our mission as capabilities.

In stating these capabilities we determine as closely as possible the time, the space and strength factors—when (usually the earliest time) he can carry out his course—where—and in what strength.

While we give the enemy the benefit of the doubt to avoid being surprised, we nevertheless use all the information and background material we have available to narrow down the time, space, and strength factors so that we will not overestimate him and thus lose many opportunities for success.

Whenever possible, usually on the basis of the enemy's dispositions, we determine his most probable capability. However, we avoid at all costs becoming so engrossed with this that we forget other courses of which he is still quite capable.

The atom bomb, the new complexion of warfare, may make our time and space charts of today soon useless, but they reinforce the importance of the doctrine of capabilities. Let us lull ourselves into believing we know what potential antagonists will do (often synonymous with what we want them to do), and we may be awakened by a triple-atom, jet-propelled, television-controlled, Buck Rogers device that was not on our list of capabilities.

Once you feel sure that you *know* what the colonel sitting across the river from you is going to do tomorrow morning, just remember that if you are a normal human being you have sold yourself a bill of goods. From that point on, unless you have an extraordinarily well disciplined mind, it is going to be easy for you to find material to support your conviction. Recall our political campaigns—how one orator can take a set of facts and prove to his and others' complete satisfaction that Candidate X is a veritable devil, while another orator, with exactly the same set of facts, can by different emphasis, selection and interpretation prove that, quite to the contrary, Candidate X is a saint.

With the system of capabilities we are not out to *prove* anything. We follow it to guard against snap judgments, preconceived opinions, overconfidence in our powers of foresight—and with it to keep our minds completely open.

21st British Army Group in Europe, 1944-45*

PART I

The following article is a lecture given by Field Marshal Sir Bernard L. Montgomery to the Royal United Service Institution, and gives a comprehensive story of the part played by the 21st British Army Group in a major campaign. As its commander, Field Marshal Montgomery tells of the problems and how they were solved as well as the strategy behind the over-all military plan. This story will be concluded in Part II in the next issue of The Cavalry Journal.

by Field Marshal Sir Bernard L. Montgomery, G.C.B., D.S.O.

IT is essential to begin by saying that in modern war every operation is combined; no single service completely predominates all the time. In the initial stages of this campaign the object was to secure a lodgment on the Continent from which further offensive operations could be developed; this was clearly a combined operation of the first magnitude.

Before the operation was launched it was the task of the air forces to create conditions favorable to a successful landing and to the subsequent development of operations inland. Both the army and the navy relied on this being done, and it was done; the heavy bombers of Bomber Command and of the American Air Force did magnificent work in weakening Germany generally, and in particular in destroying the enemy railway system, which enormously reduced the mobility of the enemy once operations began.

Until the army stepped ashore it was completely in the hands of the navy and air forces for its sea and airborne landings.

Once the army was on shore all military operations became combined army/air operations; the mighty weapon of air power enabled the army to conduct its operations successfully and with far fewer casualties than would otherwise have been the case. The army relied on the navy and on the air forces for secure communications across the sea from our island base in Britain.

As a soldier I would like to say that the army owes a great debt of gratitude to the navy and the air force and realizes fully its complete dependence on them in all military operations. I feel certain that sailors and airmen will agree that the contribution of the army to the successful conclusion of the German war was up to standard.

This campaign involved the whole problem of the conduct of offensive operations on land in Western Europe with the final object of destroying the enemy's armed forces and occupying Germany. The army had got to carry out this task; it is obvious that no other service could do it.

Therefore the first need was to decide how the operations on land were to be developed so that the object could be attained in the simplest and quickest way. It was then for the navy to say whether the army could be put on shore in such a way that the land battles could be developed in the required manner; and it was for the air force to say whether this would suit the air plan. And so the combined plan was built up; some compromise was necessary and this will always be the case; but eventually, and very quickly, an agreed plan emerged.

Before passing on to describe the plan and the opera-

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tions, I must pay tribute to the splendid teamwork that was built up by the Allies in this campaign. Under the Supreme Commander, General Eisenhower, the various components of the great force involved were welded into a fine fighting machine. "Allied Solidarity" was the keynote of our policy, and it was achieved in no uncertain manner.

From now on I shall confine myself to the purely military side of the campaign, and I should like to remind you that in relating the action of the soldiers, I speak not only of the American, British and Canadian forces, but also of the contingents of Belgians, French, Dutch, Poles, Czechs and other Nationals which were included in the 21st Army Group, all of whom played their part with distinction.

The Plan

The intention was to assault, simultaneously, beaches on the Normandy coast immediately north of the Carentan estuary and between the Carentan estuary and the River Orne, with the object of securing as a base for further operations a lodgment area which was to include airfield sites and the port of Cherbourg. The left or eastern flank of the lodgment area was to include the road center of Caen.

General Eisenhower had placed me in command of all the land forces, British and American; I was in fact his land force commander.

Once ashore and firmly established, my plan was to threaten to break out on the eastern flank—that is in the Caen sector; by this threat to draw the main enemy reserves into that sector, to fight them there and keep them there, using the British and Canadian armies for the purpose. Having got the main enemy reserves committed on the *eastern* flank, my plan was to make the break-out on the *western* flank, using for this task the American armies under General Bradley, and pivoting on Caen; this attack was to be delivered southward down to the Loire and then to proceed eastward in a wide sweep up to the Seine about Paris. This would cut off all the enemy forces south of the Seine, over which river the bridges were to be destroyed by air action. The general plan was given out by me to the General Officers of the field armies in London in March, 1944—that is, three months before D Day. The operations developed in June, July and August exactly as planned. I had given D + 90 as a target date for being lined up on the Seine; actually the first crossing of the river was made on D + 75.

Why did we select the Normandy beaches? They offered a better shelter for shipping and were less heavily defended than other possible beach areas along the Channel coast. They satisfied the minimum requirements of the air forces, in terms of their distance from home bases, for the provision of air cover. The absence of major ports was overcome by the gigantic engineering feat of constructing two artificial ports in the United Kingdom which were towed across the Channel in sections and erected, one in the United States sector and one in the British sector. In spite of considerable damage during the unprecedented June gale, the port at Arromanches in particular proved a great success.

The invasion operations may be said to have begun with the action of the air forces. The first stage was the winning of the air battle, an essential preliminary always to all major offensive operations. This task was admirably accomplished. As D Day drew nearer, attacks were delivered against coast defenses along the whole length of the Atlantic Wall. Meanwhile, prevention of enemy air reconnaissance during the period of concentration of the invasion forces was highly successful, and contributed towards the gaining of tactical surprise. Naval operations were intensified against E-boats and U-boats as the great day approached.

The Assault

My plan of assault, as approved by the Supreme Commander, provided for simultaneous landings by 8 equivalent brigades—of which three were British and two were Canadian brigades, and three were American combat teams. With the assaulting brigades, two battalions of U. S. Rangers and portions of two British commando brigades took part. The Americans assaulted on the right flank as they would ultimately require direct entry of personnel and stores from the Atlantic.

Airborne forces were used on both flanks. On the right, the 82nd and 101st U. S. Airborne Divisions dropped at the base of the Cotentin peninsula to assist in capturing the beaches and isolating Cherbourg. The 6th British Airborne Division was given the task of seizing the crossings over the Caen Canal and of operating on our extreme left.

The first task of General Bradley's forces was to cut off the Cotentin peninsula and seize Cherbourg. Operations would then develop southward. The British forces, under General Dempsey, were to make straight for Caen to establish the pivot.

It is important to mention the subject of build-up. I considered it essential for the success of initial operations to have ashore and ready for action by the end of D + 3, 7 divisions together with the necessary proportion of armor, quite apart from the airborne troops. With these forces I was confident of being able to defeat the first German attempts to dislodge our forces and also of being able to retain the initiative.

The Battle of Normandy

The assault on the beaches of Normandy began on June 6, 1944. Airborne forces were dropped first; then from a mighty armada of ships and craft, preceded by a tremendous weight of bombing from the air, American, British and Canadian troops set foot again in France.

Despite the enemy's plan to defeat us on the beaches, there were no surprises awaiting us, and our measures for overcoming the formidable array of obstacles and beach defenses were effective. The secrecy of our opera-

tions, and the special measures taken to mislead the enemy, had achieved a great measure of tactical surprise —and in the circumstances we could not hope for more. Moreover, our losses were lighter than we had expected.

Within a week the beachheads had successfully linked up, and along the continuous front Allied troops were engaged in heavy fighting in the difficult *bocage* country. Adequate stocks of ammunition and supplies had been accumulated, and our build-up was proceeding well. We had gained a strong foothold; we had suffered no setbacks; we had maintained the initiative.

Having first isolated the enemy forces covering Cherbourg by a thrust across the base of the Cotentin peninsula through St. Sauveur, the Americans turned north to deal with Cherbourg. The port was captured on June 26.

Meanwhile, the Second British Army was continuously engaged in fierce fighting round Caen, where the bulk of the enemy armor was committed. By the end of June there were 6 Panzer divisions involved on our eastern flank with a further Panzer division expected.

The Break-Out

In early July, the First U. S. Army was gaining position for the break-out from the initial lodgment area. Operations centered in the La Haye du Puits sector and in the capture of St. Lô. Meanwhile, the business of locking up the enemy armor on the eastern flank continued.

Preceded by a highly successful bomber raid, when for the first time aircraft of Bomber Command operated on the tactical battlefield, we entered Caen on July 9. In order to increase the enemy's anxiety in this sector by threatening armored action in the open country southeast of Caen, I now withdrew three armored divisions into reserve. The enemy responded suitably; the bulk of his armor remained where we wanted it.

The Second British Army now extended its front farther west in the Caumont sector in order to increase the striking force available to the First U. S. Army. The First Canadian Army (under General Crerar) took over responsibility for the extreme left sector on July 23. The stage was thus set for the break-out from the western flank.

On July 25 the main American attack started in the sector between Periers and St. Lô. The Eighth U. S. Air Force was employed in the tactical rôle and dropped a carpet of bombs immediately in front of the leading troops as a preliminary to their advance. The advance was highly successful; Avranches was taken on July 30. The VIII U. S. Corps, under command of Headquarters Third U. S. Army (General Patton), was then directed into the Brittany peninsula. With the entry into the field of the Third U. S. Army, Headquarters Twelfth U. S. Army Group (General Omar Bradley) assumed command of both American armies. The Twelfth U. S. Army Group remained under my operational control.

The enemy was trying to recover his balance as the powerful American attack pushed back his left flank and began to swing southeast and east. He tried to stabilize a front on "hinges" at Caumont, on the Orne, and on the high ground between Caen and Falaise. One by one the hinges, or "key rivets," were successively knocked out by the British armies working from west to east as the attack of the American armies on the west flank gathered momentum.

By August 6 the area Laval-Mayenne-Domfront had been reached and on the following day the First Canadian Army, which had now extended its front to include the Caen sector, began a series of major attacks astride the Caen-Falaise road.

This was an exciting time, as it was now to become apparent whether the enemy would stand and be defeated between the Seine and the Loire or whether he would endeavor to withdraw his forces behind the Seine. Between August 7 and 11 it became clear that he had decided to fight the Battle of France on our side of the Seine. On the 7th a major counterattack employing up to 6 armored divisions was launched on Hitler's orders against the American forces in the area of Mortain. It was designed to cut off the forces operating south of Avranches by a drive to the sea. In the face of this counterattack the Americans, assisted by the full weight of the tactical air forces, stood firm.

I ordered the right flank of the Twelfth U. S. Army Group to swing north towards Argentan, and intensified the British and Canadian thrusts southward to the capture of Falaise. It had become a race to trap the German forces deployed in the long salient between Falaise and Mortain. Meanwhile, the enemy received a tremendous hammering from the air.

Falaise fell to the Canadian Army on August 16; American forces had reached Argentan, and fighting of tremendous intensity was in progress at the bottleneck with the German striving all he knew to force his way out.

Speedy regrouping of the Twelfth U. S. Army Group front, combined with outstanding administrative improvisation, enabled the advance eastward of the Third U. S. Army to continue *while the battle of the Falaise pocket was still in progress.* By August 20, troops of General Patton's army reached and crossed the Seine in the area of Mantes and began to work westward along the river towards Elbeuf. While American, Canadian, French and Polish troops held the neck of the bottle, the Second British Army and First U. S. Army, strongly supported by the tactical air forces, overran and eliminated the trapped enemy. The other armies of the 21st Army Group then began the race to the Seine. They quickly reached their sectors on the river; tremendous execution was done by the air forces, particularly at the Rouen ferries.

After the Battle of Normandy

Here I will pause for a moment to discuss the enemy situation as a result of the Battle of Normandy. The

losses sustained by the Germans were truly tremendous. Of his Army, Corps and Divisional commanders, 20 had been killed or captured and two others wounded. The supreme German commander had been changed twice. Of his fighting troops, 43 divisions had either been eliminated or very severely mauled, apart from those locked up in Brittany and the Channel Islands. His losses in killed, wounded and prisoners were not far short of half a million men. His material losses were equally severe; some 1,500 tanks were destroyed and 3,500 guns were either destroyed or captured.

The Battle of Normandy had conformed to the pattern decided upon before D Day. There was nothing the enemy had been able to do which ever upset this plan, and there was never a moment in which we had not firmly held the initiative. The massive counterattack which we had always taken into consideration in our plans before the invasion never materialized in the earlier stages. He had been forced to use his Panzer formations to plug holes in the line in response to our thrusts. He was not able to launch a main stroke with them until after we had broken out of our original bridgehead. It was then too late.

The Drive to Antwerp

On September 1 the Supreme Commander assumed command and direction of the Army Groups himself, and I was no longer, therefore, his over-all land force commander. From now on my story will be primarily concerned with the 21st Army Group proper, that is, with the British and Canadian forces, together with the various Allied contingents which served with them.

In considering the development of the strategic plan after crossing the Seine the primary object, of course, was the destruction of the German Army. As a result of discussions between the Supreme Commander and myself, from now on the eventual mission of the 21st Army Group became the isolation of the Ruhr. The urgent problem was to prevent the enemy's recovery from the disaster sustained in Normandy. A major consideration was the administrative situation created by our ever-lengthening lines of communication. My administrative staff had, however, been building up reserves during August in order to support the pursuit. Imports were cut by 60 per cent in order to release a considerable quantity of transport from beach and port clearance for forward maintenance purposes.

The immediate tasks of the 21st Army Group were:—

(*a*) the destruction of the enemy in northeast France,
(*b*) the clearance of the Pas-de-Calais with its V-bomb sites,
(*c*) the capture of airfields in Belgium, and
(*d*) the capture of Antwerp.

Between August 25 and 30 the Second British Army and First Canadian Army crossed the Seine, in most cases without serious opposition. The 4 Allied armies now started advances which were eventually to bring them to the Rhine on a very broad front.

On the right of the Third U. S. Army, having concentrated east of Paris (which was liberated on August 25), was striking eastward during the first week of September to Nancy and Verdun. Shortly afterwards another column was directed southeast toward the Belfort area to join up with the Seventh U. S. Army approaching from Marseilles.

The First U. S. Army advanced over the Aisne with its right flank directed on the Duchy of Luxembourg and its left flank on the general axis Mons-Liége.

The second British Army advanced northeast on Central Belgium, while the First Canadian Army was about to sweep up the Channel coast.

The 30th Corps was the spearhead of the British drive to the north. Amiens was reached on August 31, Brussels was entered on September 3, and the city of Antwerp on the following day. This advance imposed a considerable strain on administration. We were maintaining our spearhead some 400 miles from the temporary base in Normandy. The greatest strain was thrown on road transport, because only short stretches of railway were available owing to the widespread demolitions. But all difficulties were overcome, and the pace of the pursuit was maintained.

Decision to Seize a Bridgehead

The speed of our advance through the Pas-de-Calais and into Belgium convinced me that if the Allies could concentrate and maintain sufficient strength for the task, one powerful and full-blooded thrust deep into Germany would overwhelm the enemy and carry with it decisive results. The best axis along which such a thrust could have been developed was the route north of the Ruhr leading to the plains of Northern Germany. It was obvious that the enemy would concentrate strong forces to defend this vital axis, and the industrial area of the Ruhr.

Speed was essential. The stroke could be effective only if carried out at once, taking advantage of the disorganized state of the enemy; moreover, weather conditions would inevitably deteriorate from mid-September onward and handicap the use of our air power and our airborne forces. But we would have to be strong enough on the selected axis to get decisive results quickly.

Could sufficient troops be made available, and could our maintenance resources sustain them on such long lines of communication? If so, the end of the was in sight.

The Supreme Commander came to the decision that we should not at this stage stick out our neck in one single thrust deep into enemy territory, owing to our lack of major deepwater ports. The lines of communication still stretched to the Normandy beaches and Cherbourg peninsula, and the Autumn weather was close upon us. He therefore decided that the early

opening up of deepwater ports and the improvement of our maintenance facilities were prerequisites to the final assault on Germany proper. He directed that our immediate aim should be the establishment of bridges over the Rhine throughout its entire length, and that we should not go beyond this until Antwerp or Rotterdam could be opened. In view of the time factor it was agreed that the 21st Army Group should launch its thrust to the Rhine before completing the clearance of the Scheldt estuary.

I ordered the resumption of the Second Army advance from the Antwerp-Brussels area for September 6, and by September 11 a bridgehead was established over the Meuse-Escaut Canal. It was already noticeable that the enemy was beginning to recover his balance, so that the urgency of launching the thrust to the Rhine was underlined.

On Sunday, September 17, the Battle of Arnhem began. The purpose was to cross the Meuse and the Rhine and place the Second Army in a suitable position for the subsequent development of operations toward the northern face of the Ruhr and the North German plains. The thrust to Arnhem outflanked the northern extension of the West Wall, and came very near to complete success.

The essential feature of the plan was the laying of a carpet of airborne troops across the waterways from the Meuse-Escaut Canal to the Neder Rijn, on the general axis of the road through Eindhoven to Uden, Grave, Nijmegen and Arnhem. The airborne carpet and bridgehead forces were provided by two American and one British airborne divisions and a Polish parachute brigade. Along the corridor, or airborne carpet, the 30th British Corps was to advance and establish itself north of the Neder Rijn with bridgeheads over the Ijssel facing east. From the start, however, adverse weather conditions prevailed, and indeed, during the 8 vital days of the battle, there were only two on which the weather permitted even a reasonable scale of offensive air support and air transportation. As a result, the airborne formations were not completed to strength (indeed, the 82nd Airborne Division was without a complete glider-borne combat team). It had moreover been the intention to fly in the 52nd Division, but this project had to be abandoned. Re-supply missions were repeatedly cancelled, and when flown were often on a greatly reduced scale. Had reasonable weather conditions obtained, I believe that the Arnhem bridgehead would have been established and maintained.

Full success at Arnhem was denied us for two reasons. First, the weather prevented the building up of adequate forces in the vital area. Second, the enemy managed to effect a very rapid concentration of forces to oppose us, and particularly against the bridgehead over the Neder Rijn. In face of this resistance the British group of armies in the north was not strong enough to retrieve the situation created by the weather by intensifying the speed of operations on the ground. We had not the divisions to widen the corridor sufficiently quickly to reinforce Arnhem by road.

On September 25 I ordered withdrawal of the gallant Arnhem bridgehead. We retained the vital crossings at Grave and Nijmegen, and their importance was to be amply demonstrated.

On the central sector of the Allied front, by the middle of September, the First and Third U. S. Armies were fighting on the Siegfried Line from the Aachen area through the Ardennes to the region of Trier and southward along the general line of the upper Moselle. By the third week in September the Sixth U. S. Army Group which had landed at Marseilles was firmly deployed on the right of the Twelfth U. S. Army Group and the Allied front was continuous to Switzerland.

We had moved eastward toward the Rhine on a broad front, but had been halted. We had gained great successes, but had been nowhere strong enough to gain decisive results quickly.

Operations to Open Up Antwerp

The enemy had achieved a measure of recovery. This was clear not only in the Arnhem operation, but also in his reaction to American thrusts in the Siegfried Line. We had to prepare for a hard killing match before we could secure the Ruhr and advance into Germany. We had also to open the approaches to Antwerp before winter set in. The immediate intention therefore became the clearance of the Scheldt estuary.

This task was given to the First Canadian Army and lasted through October to the first week in November. The enemy resistance was vigorous, and some very hard fighting took place, leading up to the final operation for the capture of Walcheren. The reduction of this fortress presented many novel problems. These were overcome principally by very remarkable precision bombing by Bomber Command, which breached the dykes and submerged large areas of the island. The extensive use of special amphibious devices enabled our troops to operate in the resulting floods. The naval craft put up a very fine performance in this battle in spite of severe casualties from the coast defenses and the rough seas.

Preparations for Entering the Rhineland

As the Antwerp operations were progressing, I was busy considering regrouping for the next major battle which would precede the capture of the Ruhr. I had hoped to launch an offensive some time in the late autumn to clear the area between the Meuse and the Rhine, but it was necessary first to clean up the considerable enemy forces which remained west of the Meuse, particularly in the Venlo area. We were not strong enough to do this and at the same time undertake a major thrust between the rivers.

This phase I call "the preparations for the battle of the Rhineland"—I refer here, and throughout, to that part of the Rhineland falling in the 21st Army Group

zone. These operations enabled us to economize forces by basing the front on the Meuse obstacle, and insured a friendly western flank for the battle to follow. The weather was often appalling, and the fighting took place in difficult country against a very tenacious enemy. But by early December the Second British Army was lined up along the River Meuse as far south as Maeseyck, whence the front crossed the river to the area Geilenkirchen and joined the Ninth U. S. Army.

To facilitate the Second Army operations, I transferred the responsibility for the Nijmegen bridgehead to the Canadian Army on completion of the Scheldt operations. The regrouping had a further object; the First Canadian Army was required to plan the battle of the Rhineland which was to be launched from the Nijmegen area; the Second British Army was to plan the subsequent assault across the Rhine.

While these plans were maturing, the enemy, too, was busy. The severe attrition he had exeperienced during the past two months had not prevented the re-equipment of his strategic reserve. The Sixth S.S. Panzer Army was ready for battle.

Plans for regrouping of the 21st Army Group for the battle of the Rhineland were completed by early December. We had reached the stage when some divisions were actually on the move to their new concentration areas when, on December 16, the German counter-offensive in the Ardennes broke. Our plans were postponed.

The Battle of the Ardennes

The full weight of the German counteroffensive in the Ardennes was not immediately apparent. Extremely bad weather had precluded satisfactory air reconnaissance, and the German concentration had been carried out with a high degree of secrecy. However, on the 18th I was considering the possible effects of a major enemy thrust toward Brussels and Antwerp on our dispositions—for the Army Group was at that time transferring the bulk of its weight to the extreme northern flank. I ordered the concentration for the Rhineland battle to stop, and had plans prepared for switching some divisions from the Geilenkirchen sector to the west of the Meuse.

By the 19th the full implications of the German attack were established. It was known that the Sixth S.S. Panzer Army was thrusting in a northwestern direction towards Liége, with the Fifth Panzer Army in a wider wheel on its left. The Seventh German Army was in support. On the same day the Supreme Commander entrusted to me temporary command of the First and Ninth U. S. Armies (with effect from the 20th), as they were at that time on the northern side of the German salient and therefore remote from the Twelfth U. S. Army Group axis.

On the 19th I ordered General Dempsey to move the 30th Corps west of the Meuse to a general line from Liége to Louvan, with patrols forward along the western back of the river between Liége itself and Dinant. This Corps was thus suitably placed to prevent the enemy crossing the river, and could cover the routes from the southeast leading into Brussels. It subsequently became necessary in connection with the regrouping of the American First Army to send some British divisions east of the Meuse. But throughout the battle I was anxious to avoid committing British forces more than was necessary. Had they become involved in large numbers, an acute administrative problem would have resulted from their lines of communication crossing the axis of the two American armies. Moreover, it was foremost in my mind that as soon as we had defeated the German attack we should return to the business of the Rhineland battle as quickly as possible.

The Battle of the Ardennes was won primarily by the staunch fighting qualities of the American soldier, and the enemy's subsequent confusion was completed by the intense air action which became possible as weather conditions improved. The Sixth S.S. Panzer Army broke itself against the northern shoulder of the salient while the Fifth Panzer Army spent its drive in the fierce battles which centered on Bastogne. Regrouping of the First and Ninth U. S. Armies, assisted by British formations, made possible the rapid formation of a reserve corps of 4 U. S. divisions under General Collins. The action of this corps, coördinated with the drive from the south by General Patton's Third U. S. Army, pinched the enemy forces out of the salient and began the bitter struggle which was to push them out of the Siegfried Line.

The enemy had been prevented from crossing the Meuse in the nick of time. A detailed study of the battle would show how rapid regrouping enabled the Allies to regain the initiative which the enemy had temporarily seized. Once we were sure of the Meuse crossings it became increasingly apparent that the opportunity had come to turn the enemy's position to our advantage. Hitler's projected counteroffensive ended in a tactical defeat, and the Germans received a tremendous battering. As soon as the situation had been restored I was able to order the British divisions north again to the concentration areas which had been made ready in December.

The Battle of the Rhineland

The main objective of the Allies on the Western Front remained the Ruhr. Once the Ruhr had been isolated from the rest of Germany, the enemy's capacity to continue the struggle would quickly peter out. Beyond this, the object of our operations was to force mobile war on the enemy by developing operations into the northern plains of Germany. We were therefore required to line up on the Rhine; then to bridge the river and gain a suitable jumping off position for a mobile campaign in the spring. The enemy was in a very bad way; he had suffered another major defeat with heavy losses in men and equipment. Moreover, the great

Russian winter offensive was now under way, and we did not wish to give the enemy the chance to switch forces to the east.

The Supreme Commander's orders to the 21st Army Group provided for a line-up on the Rhine from Düsseldorf northward. The Ninth U. S. Army remained under my operational control.

First we had to eliminate the enemy salient west of the River Roer between Julich and Roermond. The Second Army completed this task by January 28. The divisions concerned, less defensive troops left holding the river line, immediately started north to join the concentration for the Rhineland battle. In studying the plan for this battle you should notice how the grouping of the armies was related to their subsequent tasks. I have already mentioned the transfer of the Nijmegen bridgehead to the First Canadian Army, which was to be responsible for the northern thrust.

The Battle of the Rhineland was based on two converging offensives between the Rhine and the Meuse with the object of destroying the enemy forces masking the Ruhr. It was intended, by interdiction from the air and by employing the maximum available forces on the ground, to prevent the enemy withdrawing to the east bank of the Rhine. In this we were largely successful.

The First Canadian Army was ordered to launch an attack southeast from the area of the Nijmegen bridgehead to meet the Ninth U. S. Army, whose thrust was developed from the Julich-Roermond sector northward. It was originally planned to launch the two operations almost simultaneously, but the southern thrust was delayed. In the event this proved to our advantage.

The date by which the Ninth U. S. Army could attack was dependent on the rate at which U. S. divisions could be released from other sectors of the Allied front, as the strength of that Army was to be increased to 12 divisions. Release of these divisions depended on the situation on the rest of the front. The Twelfth U. S. Army Group was still involved in the Ardennes, particularly in thrusting toward the system of dams on the River Roer which control its flood waters. As long as the enemy held these dams he was in a position to impose flood conditions likely to impede the crossing of the river. Farther south, the heaviest fighting was in the Saar and in the Colmar pocket—in both areas the enemy had achieved local successes. The weather remained an anxious uncertainty. The thaw was beginning and, apart from the floods, it was playing havoc with our road communications.

The concentration of divisions for the Canadian Army attack was completed in the first week of February. Elaborate arrangements were made to assemble the forces employed into the very confined concentration areas, and also to mislead the enemy about our intentions.

On February 8 the northern wing of the pincer movement started. The 30th Corps, under command of the First Canadian Army, launched its attack into the Reichswald Forest and the northern extension of the West Wall on a front of 5 divisions, supported by very considerable air forces and over 1,000 guns. This began the memorable battle which, in intensity and fierceness, equalled any which our troops have experienced in this war. The Germans quickly built up to about 11 equivalent divisions, including 4 parachute divisions and two armored divisions. In particular their paratroops fought magnificently.

Meanwhile the situation was improving in other parts of the Allied front. Operations in the Colmar area had been successfully concluded and the Germans thrown back across the Rhine at the southern extremity of the Allied front; the Saar sector had been stabilized. More important still, the Sixth S.S. Panzer Army was transferred to the eastern front to oppose the mounting Russian offensive. The concentration of American divisions into the Ninth U. S. Army was achieved remarkably quickly, over long distances, using shocking roads and tracks, and in appalling weather.

The launching of the American thrust had been planned to start between February 10 and 15 but at the last minute, before abandoning the Roer dams, the enemy carried out demolitions which loosed the flood waters. There followed an anxious period of waiting, with all the troops teed up for the battle, while the water subsided sufficiently to enable the crossing to be launched. On February 23 the Ninth U. S. Army, under command of General Simpson, commenced its attack north toward the area where the First Canadian Army was fighting a most intense battle. Owing to the delay in starting the southern thrust, the Reichswald battle had drawn enemy strength from the Ninth U. S. Army sector. The Americans took every advantage of this opportunity and advanced with admirable speed; their action in its turn eased the pressure in the north.

As the Ninth U. S. Army swung north, the First U. S. Army was made responsible by the Supreme Commander for the security of its southern flank; the thrusts toward Cologne were thus related directly to our operations.

The keynotes of the Battle of the Rhineland were the intense and fanatical opposition of the enemy who, as we had hoped, accepted battle west of the Rhine, and secondly the appalling weather conditions. The northern flank of the Reichswald operations was conducted mainly in various types of amphibious vehicles; in general, the mud and slush were indescribable and greatly hampered the movement of troops and supplies through the heavily wooded areas which are so lacking in roads.

On March 3 the two armies linked up, but it was not until the 10th that the enemy bridgehead covering Wesel was liquidated. The 21st Army Group was now lined up on the Rhine as far south as Düsseldorf.

The enemy had suffered yet another heavy defeat. He had lost nearly 100,000 men in killed, wounded and prisoners. Eighteen divisions and a large number of

hastily formed units had been battered. The end of the war could now only be a matter of weeks. Once more the essential factor was speed.

Meanwhile, on March 7-8, farther to the south, the First U. S. Army had secured the bridge intact at Remagen after a quick advance through most difficult country, and Cologne had been captured. By the middle of the month the Third U. S. Army completed a remarkable operation, which brought it up to the Rhine at Coblenz and thence along the line of the Moselle to Kyllburg. The Sixth U. S. Army Group was forcing its way into the Saar from the south.

Outstanding German Mistakes

This is a good moment to pause and consider the German situation at the time the 21st Army Group was preparing to cross the Rhine. To my mind, from the time the Germans became involved in war with Russia and America in 1941, the fate of Germany was sealed. From then on the question was how long it would take the Allies to win.

Between Normandy and the Rhine the Germans made three major errors which were to lose them the war in Europe by May, 1945. The first was the decision to fight the Battle of France south of the Seine. By failing to surrender the territory between the Seine and the Loire and to take advantage of the Seine obstacle, they suffered those tremendous losses which I have already mentioned, and in addition there were obvious and widespread political repercussions. But they subsequently made a most remarkable recovery. They succeeded in forming and equipping new divisions, and they established a cohesive front on the rivers and canals of the Low Countries. They proceeded to build up a strong mobile striking force, which by December was ready for action.

Then came the second mistake. They launched a counteroffensive in the Ardennes designed to hit the Allies so hard that the German striking force could subsequently be switched to the east. But they failed to win the air battle first; they had not the air resources nor adequate supplies of fuel for a major counter stroke, and were wrong to attempt it. While some progress was made in the short period of bad weather, the enterprise was doomed to failure. A counterattack, Yes; a counteroffensive, No.

Following the failure in the Ardennes, the proper procedure was to withdraw behind the Rhine. The third big mistake was the decision to stand and fight west of the river in the hope of masking the Ruhr.

After the crippling losses sustained in the Battle of the Rhineland, the end of the war was only a matter of weeks. The Germans had not the manpower to raise new divisions, and in any case their industry could not have equipped fresh formations. The policy of dispersing German industry rebounded now that they were unable to assemble war material or move it to the fighting troops. Their remaining oil refineries and storage plants were being subjected to increasingly heavy air attacks, and their communications were rapidly being reduced to a state of chaos. As a result they had not the transport or fuel necessary for mobile operations, nor had they the tanks to compete with the Allied armored forces in battle.

The Battle of the Rhine

The quicker we could engage the enemy in mobile warfare in the north German plains, the sooner the end would come. While the Battle of the Rhineland was proceeding, the details for the crossing of the Rhine were being worked out. Many engineering and administrative preparations had been initiated back in December, before the Ardennes counteroffensive. In particular, work had started on the roads and railways necessary to establish our lines of communication across the Meuse and Rhine. We had furthermore stocked the Second Army depots with some 130,000 tons of stores for the coming operations. And so the 21st Army Group launched the operation for crossing the Rhine a fortnight after completion of the Battle of the Rhineland. Future history must give the armies great credit for this. It was a most remarkable achievement.

The fortnight between the end of the Battle of the Rhineland and the crossing of the Rhine was one of intense activity. Formations were regrouped and lined up in their correct positions, covered by a screen of troops holding the riverbank. Dense and continuous clouds of smoke were employed to hide our intentions and final preparations.

The attack began on the night of March 23, and by the next morning all 4 assaulting divisions (two British and two American) and the British commando brigade had accomplished their initial crossings between Rheinburg and Rees. The key to the crossing was the important communication center of Wesel, which was captured by the commando brigade after an intense air attack by Bomber Command. On the morning of the 24th, the XVIII U. S. Airborne Corps, with one British and one American airborne division, dropped on the east bank of the Rhine within supporting distance of our guns on the west bank.

The enemy reaction was initially strongest on the northern flank, where three parachute divisions had been concentrated. But generally speaking his power of maneuver was greatly limited by the very heavy air interdiction program which had been originated several days before the assault. The airborne troops took full advantage of his failure to launch any effective counterattack against them and rapidly made contact with the formations crossing the river. The British and American bridgeheads were quickly joined. Some remarkable engineering feats were accomplished in working ferries and bridging the river, and it is interesting to note that the Royal Navy was well to the fore with craft which had been dragged by road all across Belgium, southern Holland and the Rhineland.

We were now in a position to drive into the plains of northern Germany. It was a matter of great satisfaction to see how plans which had been maturing back on the Seine were reaching their fulfilment.

Meanwhile, the Remagen bridgehead continued to engage increasing enemy forces, and in spite of them was steadily expanded. The bridgehead was extended to Bonn and the First U. S. Army began thrusting east and northeast in a drive which had reached the Paderborn area by the end of the month. The Third U. S. Army had crossed the Moselle and, in conjunction with the Sixth U. S. Army Group, eliminated the Saar triangle and brought the whole Allied front up to the Rhine. In the fourth week of March General Patton's forces crossed the river astride Mainz and came up on the right of the Frist U. S. Army.

The Advance to the Elbe and Baltic

Within 4 days our bridgehead over the Rhine had been established, and on March 28 the advance to the Elbe began. On the right flank the Ninth U. S. Army was directed to the sector Magdeburg-Wittenberge. In the center the Second Army was to advance with its left flank on Hamburg. On the left, the 2nd Canadian Corps, after crossing through the Second Army bridgehead, swung north along the Rhine to outflank Arnhem and open up the routes leading northward from that area. Later, the 1st Canadian Corps assaulted across the river at Arnhem and turned into western Holland to establish a protective flank between the Rhine and the Zuider Zee.

The enemy tried desperately to assemble his remaining forces in opposition to our advance. The core of his resistance formed on the Ems-Dortmund Canal, facing the left and center of the Second Army. Bitter fighting ensued. In the meantime, in the Ninth U. S. Army sector and on the right of the Second Army progress was rapid. By April 3, the Ninth U. S. Army had reached the Weser in the Minden area and had linked up with the First U. S. Army advancing from the Remagen bridgehead. The Ruhr was enveloped. The Ninth U. S. Army reverted to the command of the Twelfth U. S. Army Group. The two U. S. armies proceeded with the clearance of the Ruhr and at the same time pushed forces eastward to the Elbe.

The subsequent action of the 21st Army Group may be compared with the drive across northwest France. The German east-west lines of communication to the coast were progressively cut, and a series of right hooks were delivered to round up the enemy. The left flank formations drove up toward the coast to finish him off.

The 8th Corps of the Second Army crossed the Weser near Minden on April 5, followed a few days later farther north by the 12th Corps, which then worked its way along the east bank in an advance that brought it to the outskirts of Hamburg. This wide turning movement loosened the enemy on the left, and while Bremen was masked from the south by the 30th Corps, a hook farther up river came in on the city from the east. Bremen fell at the end of the month.

The First Canadian Army made steady progress, and by mid-April had liberated most of northern Holland. By the same time the 1st Canadian Corps had safeguarded our flank in western Holland and isolated the large enemy garrison there.

The main drive to the Elbe continued toward Luneburg, which was reached on the 18th, and our forces began to line up on the southern bank of the river masking the city of Hamburg. The Elbe was crossed on April 20 and spearheads made straight for Lubeck in order to seal off the Schleswig-Holstein peninsula. At the same time, moving by road, a U. S. airborne corps of two divisions, together with the 6th British Airborne Division, formed a defensive flank facing east on the line Darchau-Schwerin-Wismar. Once across the river our operations were virtually unopposed. The plan for outflanking Hamburg by a maneuver similar to that used at Bremen was actually under way when, on May 2, the Germans came out to negotiate its surrender. Across the Elbe the countryside was packed with a mass of German soldiers and refugees fleeing from our own advance and from that of the Russians, with whom we established contact on May 2.

The negotiations which began in Hamburg led on May 3 to the dispatch by Doenitz of envoys to my tactical headquarters, then at Luneburg Heath. By this time I had ordered a pause in our advance to be made on a line which would cover Hamburg and Lubeck. Some fighting was still in progress with German remnants in the Cuxhaven and Emden peninsulas.

The German delegation which came to my headquarters was headed by General-Admiral von Friedeburg, Commander in Chief of the German Navy. He was accompanied by General Kinzel, Chief of Staff to Field Marshal Busch, and by Vice-Admiral Wagner. I quickly established that they had not in fact come to negotiate the unconditional surrender of the troops on my front, and at once made it clear that I would not discuss any other matters. I did, however, take the opportunity to show Von Friedburg the operational situation on my map; and when he realized, apparently for the first time, the plight of the German armies on the various fronts, he broke down and wept. He hurried off to recommend to Doenitz the unconditional surrender of all German naval, land and air forces opposite the 21st Army Group. On the evening of May 4th, Von Friedeburg returned to my headquarters and signed the instrument of unconditional surrender of those forces.

Cease fire was ordered on the 21st Army Group front as from 8 A.M. on May 5.

(In the concluding installment in the next issue of THE CAVALRY JOURNAL, Field Marshal Montgomery discusses: The Grouping of Forces; Specialized Equipment; The Royal Armored Corps; Artillery; The Engineers; Signals; Infantry; Airborne Forces; The Medical Organization; and Conclusions.)

Signal Corps Photo

Half-tracks of the 3d Armored Division cross the Saale River in Germany on bridge constructed by the 23d Engineers.

The Armored Engineers

WHENEVER we glanced at a press account of a characteristic sortie of an armored division in the campaign in Europe, we were often overwhelmed by the correspondent's stock of vigorous verbs and appropriate adjectives. The blank armored division "slashed," "ripped," "plunged through," "stormed through," "overran," "annihilated" and, in general, raised so much hell, that, in the minds of most readers was conjured the vision of an unstoppable juggernaut that needed only to be placed in motion and it would not stop until its commander willed it. Such was not always the case, in spite of all of the artistic verisimilitudes of war reporting, and many a tank commander read those accounts with his tongue in his cheek, especially if his attack had been halted by a cleverly laid minefield, an ingenious road block, a demolished bridge, or one of a dozen other means that the not always withdrawing foe employed.

Confronted by these obstacles the tank officer was certain to shout for his armored engineers, who were, if the tanker was battle-wise, within earshot at the head of the column, and the elimination of such obstacles was quickly undertaken.

Let's then take a look at these armored engineers in the armored divisions, the counterpart of the combat engineers in the infantry division; and, the wherewithal at their disposal with which they performed the multitude of jobs that was their lot in order to break the tanks loose through obstacles that would have stopped them.

Of about the same size as an engineer combat battalion (38 officers, 675 enlisted men) the armored engineer battalion is completely mobile with its organic transportation which includes some armored vehicles. It has three line companies and a headquarters company. With its commanding officer a member of the division commander's special staff, the battalion is completely in the tactical picture at all times as to what is happening and the part it will play.

Containing modern engineer equipment with the emphasis upon machinery rather than manpower to obtain results, this battalion's armored bulldozers, air-compressors, flame throwers, mine detectors, gasoline-powered saws, and other apparatus in the capable hands of the armored engineers is one reason for the superlatives concerning the tank units from the newspapermen. It wasn't very long until the combat commander learned the value of the engineer bulldozer. The bulldozer with its highly trained operator could perform miracles in the way of clearing road blocks, improvising by-passes and fords, and it was little wonder that the sharp-shooting crews of 88's sometimes gave a bulldozer target priority over a tank. The demolition expert was frequently in demand to eliminate by explosives an obstacle in the path of the advance, and also to create by craters, and the like, barriers on the flanks of the forward

surging armored column. Flame throwers played their part both as offensive and defensive weapons, and, at the onset it was the engineer's portable thrower that did the job later taken on by flame-throwing tanks. As for mine detector crews, not only were the armored engineers masters at this dangerous game, they taught all the troops of the divisions how to operate the marvelous apparatus that was to save lives and equipment in battle. Laying protective minefields or lifting enemy ones became second nature to the engineer. Only in a stabilized situation did the armored engineers clear complete enemy minefields, normally they merely gapped the field sufficiently to get the tanks through and left the remainder, properly marked, for the army engineers to lift.

Early days in the evolution of the armored division saw a larger engineer battalion which included two additional companies: one, a line company, and the other a treadway bridge company. The bridge company was organized and equipped to transport the bridging equipment of the division.

From the time it was first conceived by the Armored Force, the treadway bridge passed through an extreme development period. Initially in a table of equipment drawn up in the fall of 1940, Captain Bruce C. Clarke (now Brigadier General) the acting Armored Force Engineer, included a bridge of treadway design unsupported for short spans and trestle supported for long ones. The length of this bridge was roughly 300 feet and no attempt at adapting it to a floating type bridge was undertaken until 1941 when the late Colonel T. H. Stanley and his assistant, Major W. E. Cowley, energetically and successfully accomplished that conversion with the development of rubber pontoons. At first known as the M1 floating treadway bridge, later superseded by the M2 floating treadway bridge, it was tested exhaustively under field conditions by armored divisions in prewar maneuvers. Results of these tests and advancements in tank and vehicle development with regard to weight and dimensions led to a corresponding trend in the M2 bridge development, with the result that a shorter and wider tread was used. Specially designed trucks were manufactured to transport and handle the basic load of 872 feet of M2 equipage with which each engineer treadway bridge company is now provided. Here again the emphasis was on machinery instead of men to do the backbreaking work with each truck being provided with a hoisting mechanism for use in unloading the bridge parts and in constructing the bridge.

The treadway bridge is the armored engineer's baby. He swears by it, he hoards it, he almost reveres it. Let someone attempt to argue the merits of other types of portable bridges and he will quickly point out that in the ETO, almost without exception the tactical bridge first open to traffic was the treadway bridge. Constructed under every condition that modern warfare created, this modern equipment utilizing a minimum of construction personnel trained to handle the bridge parts with mobile engineer cranes constantly had German high commanders baffled with the rapidity with which supposedly impassable barriers were overcome. This was not only true in the case of large streams but also in the bridging of small gaps created by demolished bridges, culverts, or road cratering.

A cleverly sited, though small, crater in a tank defile will certainly stop an armored column. Supporting Brigadier General Bruce C. Clarke's 4th Armored Combat Command (the "spearpoint of the spearhead" of Patton's sweeping drive in France) for two and one-half months, the battle-wise and sweating engineers of Company C, 24th Armored Engineer Battalion, constructed no less than 21 bridges, the average length less than 50 feet! No wonder then that Lt. Col. L. E. "Bud" Roth, in an operational report wrote—"It soon became apparent that short unsupported span treadway sections were our most important bridge, and were a tactical success due to the rapidity with which antitank obstacles could be crossed." German top-ranking officers subscribed eloquently and at great length to this fact, when, after capture they confessed their complete surprise and consternation at the speed of the engineer elimination of obstacles which permitted impatient American tanks to repeatedly nip and slice off the tail ends of retreating German columns. It is not surprising that this marvelous piece of bridging equipage is rated by many top Allied commanders as one of the principal items of tactical equipment contributing to our final victory.

To Major General Lunsford E. Oliver, now on Army Ground Forces Staff, goes much of the credit for the development of the treadway bridge. As Armored Force Engineer, in the early stages of the expansion of the Armored Force, he, realizing the urgent need for a military bridge capable of being transported by the armored engineers in the fast moving, highly mobile armored division, successfully pushed to completion the adoption of the now famous bridge. Years later, in late March 1945, as his 5th Armored Division was crossing the Rhine River at Wesel, Germany, it was using the treadway bridge in the development of which he had played so important a part. Standing on the bridge in midstream as his tanks roared by, the General urged them on at greater speed growling to the engineer officer at his side ". . . The bridge can handle them faster than this, dammit, I know!"

Although the treadway bridge company was taken out of the Armored Engineer Battalion under a reorganization and made a separate unit under Corps or Army control, experiences in the ETO proved it was necessary to make such a company available to an armored division if the complete effectiveness of the division was to be realized. An outstanding example is offered by the 5th Armored Division. On the eve of September 5, the division reached the banks of the Meuse in the vicinity of Sedan to find all the bridges

destroyed. With the attached bridge company (the 993d) the divisional engineers immediately began the construction of three treadway bridges across the 200-foot stream. Erected under enemy fire the bridges were rapidly completed and allowed the division to press onward through Luxembourg and into Germany without losing momentum. No doubt due to the extended position of the division with respect to corps troops, a delay of several days might have occurred in this particular situation had it been necessary to await Corps Engineer Troops and equipment. Small wonder then that the armored divisions are insistent that the bridge company be included as a part of the division.

On the morning of March 24, 1945, the 30th Infantry Division had just gotten its assault troops across the Rhine River a few miles upstream of Wesel when Captain McAdams' engineer treadway bridge company of the 17th Armored Engineer Battalion ("Hell on wheels" 2d Armored Division) went into action. For days his men had been keyed at high pitch for the mission that every engineer dreamed of—bridging the Rhine! Planning was complete, each man knew his job and executed it well. Seven and one-half hours after commencing the bridge, it was complete. Extending 1,250 feet across this tremendous water barrier it allowed the corps commander to cross his tanks and commit them in support of the 30th's doughboys hours ahead of even the most optimistic plans. This rapid crossing, buildup, and exploitation so surprised and confused the Germans that they were completely demoralized. It helped win for the treadway company the Presidential Unit Citation which President Truman awarded when he visited Berlin.

Almost without exception, it was the same story throughout the campaign in Europe with the engineers surpassing in speed all estimated times of completion of the many tactical bridges they constructed.

Engineers, to a man, love to build bridges. Many of their apparently less glamorous missions are none the less important. Consider for a moment the typical entries in an armored engineer battalion daily log:

* * *

"29 Aug 44—2d Platoon, Company C, cleared mine and roadblock obstacle. Knocked out 20mm gun emplacement and several enemy—no prisoners. Platoon mission to create diversionary action."

* * *

"11 Sept 44—2d Platoon, Company B, constructed 168 feet of floating M2 treadway prior to daylight of 12 September. Remaining engineers committed as infantry during night—securing, outposting, and mopping-up bridgehead. Battalion CO severely injured in action and evacuated."

* * *

"20 Sept 44—1st Platoon, Company A – Armored Engineer Battalion, and C Company – Armored Infantry attacked and entered Château Salins; engineers clearing 200 yds of abatis, roadblocks and mines, opening route to northeast for Task Force."

* * *

"24 Sept 44—Plans made to continue attack to northeast—. Severe enemy counterattack was preceded morning of 24 Sept 44 by heavy artillery concentration in Company B area. Commanding Officer and Executive Officer, Company B, KIA. At 1400, 24 Sept 44 CCB considered situation untenable and ordered engineers—to withdraw through Foret de Gremercy."

* * *

"26-27 Dec 44—2d Platoon, Company C, with advance guard CCR, supported advance of Task Force by removing mines ahead of tanks, reconnoitering possible routes and outposting sector of Task Force area upon arrival in Bastogne. Minefield removed."

* * *

Basic training of engineer soldiers includes that of infantry missions and the Armored Engineers, who proudly display the castle of their branch, had ample opportunity to put it into effect. Captain Don Hatch, veteran soldier and commander of an armored engineer company holding Hill 318 southeast of Arracourt, was ready to turn in his castles for a pair of crossed rifles on the morn of 29 September when in the early autumn dawn the Krauts attacked and overran both his 1st and 3d Platoons. Massing tanks and infantry the hill was in German hands by 0730. Hastily reorganized and bolstered by a platoon of Tank Destroyers, the engineers attacked and retook Hill 318 by midafternoon. Hand placed explosive charges accounted for 4 Panther Tanks, the TD's added an even half dozen more.

For his reconnaissance, the Armored Division Engineer depended on his engineer reconnaissance sections which were always a part of the advance guard in the tank columns. Dependent almost entirely upon radio communications, difficulties were at first experienced due to the limited range of the sections' radios. This means of communication was corrected and improved as time went on; to prevent unnecessary delay it was imperative that the engineer have adequate facilities to obtain vital information on blown bridges, minefields, impassable routes, etc., on which to base his engineer plans. Then, just as a tactical commander, he could mass his personnel and equipment in order to efficiently and expeditiously carry to completion any assigned mission. Engineer reconnaissance sections operating without armored vehicles were particularly vulnerable and often the tank units would make armored vehicles available to the engineers. In a similar way, arrangements were made to utilize division artillery and liaison planes for flying engineer missions. Armored Engineers want armored vehicles and planes organically and if the expectations of armored division commanders are to be realized we expect they'll get their planes and tanks.

Editorial Comment

General George S. Patton, Jr.

The strife is o'er
The battle done;
The victory of life is won
The song of triumph has begun.

Lord! by the stripes which wounded Thee,
From death's dread sting
Thy servants free
That we may live and sing to Thee.

THE United States Army has lost one of its most brilliant and courageous generals. On December 21, 1945 in a Seventh Army Hospital in Heidelberg, Germany, General George S. Patton, Jr. passed away after being injured in an automobile accident.

George Patton was a born soldier and a great student of military history and tactics.

From the time he graduated in 1909 from West Point, his career in the army was vigorous and colorful. After graduation he entered the cavalry and served at Cavalry posts all over the United States. He was with General Pershing on the punitive expedition into Mexico in 1916, and went to France on Pershing's staff in 1919.

In November of that year he was detailed to the Tank Corps and after a course of study at the French Tank School, joined the British when they first employed tanks at Cambrai. He later established an American Tank School at Langres, France, but he wanted action, and as commander of the 304th Tank Brigade, fought in the St. Mihiel and Meuse-Argonne offensives, when he was wounded.

In 1940 he was in command of the 3d Cavalry at Fort Myer, Virginia, but was promoted to a brigadier general and placed in command of the 2d Armored Division in 1941. A short time later he took command of the I Armored Corps.

On November 8, 1942 he landed in French Morocco and led the II Corps in the North African campaign. He was put in command of all American Forces in Tunisia and in July, 1943, went ashore at Gela, Sicily with his Seventh Army. In 38 days he had outblitzed the Blitz Kriegers. He then left the Seventh Army to organize the Third Army which he commanded in its spectacular drive across France and Germany.

The Germans had the greatest respect for his fighting abilities. It has been stated by one high German general that General Patton was feared by the German generals more than any other commander.

In December, 1944, the German Ardennes offensive had broken through Allied lines in Belgium, but although it had been checked there was a chance that the lines might not hold unless the Germans could be dealt a strong counter-blow. General Patton's Third Army moved up fast from the south (where the original Allied attack had been planned) and struck a blow on the German flank which sent it reeling back toward the Fatherland. A stunning and final blow from which it never fully recovered.

It is said that General Patton used his armored divisions as Stuart employed the Confederate cavalry.

Robert S. Allen, a United Features Syndicate writer, in an article on General Patton, stated that he considered Patton the greatest tank commander of World War II. Mr. Allen went on to say:

"In grasp of the true concept of the employment of armor and in the successful employment of large armored forces on many decisive battlefields, Patton was without peer in any army, friendly or hostile.

"Yet his first and undying love was the horse. From earliest youth to his untimely death he was the born cavalryman, in the mighty mold of Ney, Jeb Stuart, Sheridan and Forrest. He loved, understood and rode horses as only the born cavalryman can. A large part of his life, and considerable means were devoted to this passion. Also, to steeping himself in the fundamentals of cavalry tactics.

"He knew by memory the details of every consequential cavalry action and campaign from ancient times down. He fought his tanks as the cavalry chieftains of history fought their battles on horses. To Patton the tank was a mechanical modern version of the horse, an implement to wage lightning-fast and paralyzing war.

"With the tank he coupled the airplane. To him it, too, was merely another version of cavalry.

"Until the day of gas-powered mechanical warfare, cavalry had performed the role of executing wide end runs, of breaking through an enemy's lines, of enveloping his rear and destroying his lines of communication and supply. Patton employed the tank-plane team to the same ends.

"That was the core of his genius as a great battle commander and the secret of his fabulous victories.

"But horses were his great love. Time and again, in Africa, Sicily and the ETO, he vainly beseeched higher authority to give him some horse cavalry on the ground that he could employ it with decisive effect to implement his tank-plane team. He greatly admired the Russian cavalry and followed intently the exploits of the Cossacks on the Eastern Front."

In a recent letter to Major General John K. Herr, U.S.A. retired, former Chief of Cavalry, General Patton wrote:

"At the Secretary of War's press conference, I stated

that had we possessed Cavalry in Tunisia or Sicily, very few Germans would have escaped. I personally advocate the retention of at least one cavalry division (horse) and the creation of a number of cavalry regiments (mechanized)."

Fate was cruel to this brilliant military leader who continually defied death on the battlefields of Northern Africa, Sicily, France, and Germany, and then, when he was due to return home for a long well-earned leave, was fatally injured in an automobile.

General Patton was buried at Hamm, Luxembourg in the area where he did such brilliant fighting, where his achievements will never be forgotten, and where rest the bodies of hundreds of other courageous American soldiers who fought there with him.

It is the way George Patton would want it to be.

* * *

Autoflight Jet Propulsion Unit

A REVOLUTIONARY American version of the German V-1 buzz bomb engine, so efficient it can fly through the air without wings, is one of the latest developments in the field of jet propulsion. Today suitable only for supersonic speed airplanes, tomorrow scientists may apply it to all types of marine and land transportation.

Information released by the Army on a small test model of 2-lb. thrust, which is but four one-thousandths of the size of the V-1 engine in capacity, states that it works perfectly in every respect and, pound for pound, is superior in many other ways to the German propulsion unit. The tiny wind tunnel model is but two feet long and approximately two inches in diameter, is made of aluminum alloy and stainless steel and weighs only five ounces. With a small, lightweight fuel tank, this engine, launched from an inclined plane, would fly through the air without the necessity of wings.

The engine is fully controllable, burns gasoline or kerosene, and, after once being started by means of a small spark plug, will run until fuel is exhausted without ignition being necessary. The engineers who developed it claim considerably greater efficiency for the Klose model, known as the Autoflight jet propulsion engine, over its German prototype by reason of more thrust, less weight and smaller size. The American model also fires many times faster than the German engine, thus developing more power. The wind tunnel model, for instance, when operating at full throttle, fires several hundred explosions per second.

One of the problems yet to be solved in jet engine construction, according to the engineers, consists of sound control, since attempts to muffle jet engines have resulted in great loss of efficiency. Engineers who work in wind tunnels and testing laboratories with jet engines wear earplugs, otherwise they are subject to headaches and ringing ears for several days.

Potential use of this new jet engine is still a subject under government restriction.

COMBAT EXPERIENCES

Now is the time to write us a story of your experiences in combat.

The lessons you learned are valuable to others in the future training of our armed forces.

Even though the war is over, the record of what happened there still is important—and will be for historical reference.

We need articles on armored combat especially.

Now that you have more time, why not write up how your unit fought, what it learned, and the mistakes it made?

Write it your own way. Include photos if possible.

Anything from 500 to 2,000 words or more.

Address it to: The Cavalry Journal, 1719 K St., N.W., Washington 6, D. C.

What have you learned in combat that will help others?

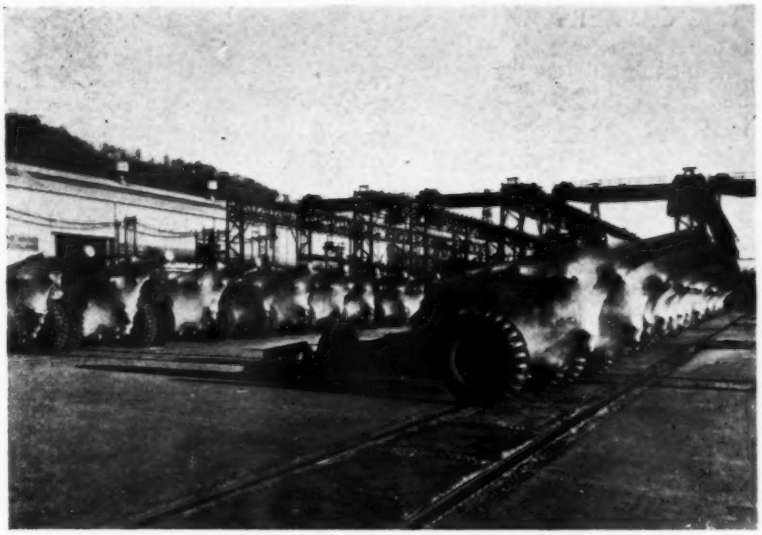


Photo No. 1. Army Ordnance matériel is shown in live storage. This method of storage, developed by the Navy and described in the November-December issue of The Cavalry Journal, is good only for interim storage. The methods described in the story below will preserve matériel for from 25 to 50 years.

LONG TERM STORAGE

by Colonel Fred I. Gilbert, Ordnance

UPON the termination of the war, the Ordnance Department was faced with the gigantic task of preserving and storing quantities of war reserve fighting matériel. With the coöperation of industry and scientific institutions, a new departure from any method previously used to store equipment has been developed. This new method, which has very little if any parallel in industry, might be described as the "canning" of Ordnance equipment.

"Canning" actually means placing various types of fighting equipment in sealed metal containers in order to eliminate the destructive forces of nature in the form of rust, corrosion, mildew, etc., which render our fighting equipment useless when permitted to gain any degree of headway.

Attention to this postwar problem is being given at this time because it is vital that the taxpayers' investment in war equipment be conserved to the greatest possible extent. In line with the philosophy of our forefathers of "keeping our powder dry," it is felt that the majority of this ultra-modern fighting equipment should be placed in permanent storage where it can be kept with little or no attention until it might be needed, or until it becomes obsolete.

By enclosing equipment in sealed containers, maintenance costs can be eliminated. Rather than fritter away energy and funds in recurring maintenance, Ordnance engineers will now be in a position to concentrate on research and development of improved weapons to keep American fighting equipment in the forefront in world preparedness.

The conventional approach to this problem has been through disassembly of complicated equipment and coating with Cosmoline. Due to the complexity of the newer equipment, it would hardly be possible to reassemble under emergency conditions and meet a deadline.

Common experience looks upon ordinary warehousing as a satisfactory method of storage. Ordnance Department experience definitely proves that in many cases inside warehousing permits serious corrosion. The astronomical production of the present war has increased the requirement for storage space to the extent that if warehouses were to be used, the space now available to Ordnance would have to be increased many, many times, and still would not provide adequate protection.

Any maintenance of complicated matériel in Ordnance warehouses necessitates a continuous schedule of

overhaul and relubrication. For example, an antiaircraft gun, which must be overhauled every 12 to 18 months to keep it in operating condition, costs from $1,000 to $5,000 per gun per overhaul.

Dehumidified warehouses have been suggested as a method of eliminating the maintenance burden—but only specially constructed warehouses can be dehumidified and these would be extremely expensive to build and operate.

It is important to emphasize that ordinary so-called "air-conditioned" buildings are inadequate, since it is necessary to maintain a relative humidity level below 30 per cent at all times to insure absence of corrosion, whereas many air-conditioned buildings operate at a relative humidity of from 50 to 70 per cent.

The average person realizes that rust or corrosion of simple metal objects exposed to the out-of-doors is less serious in certain dry localities in the far west. Investigation in coöperation with the weather bureau has established that no part of the United States consistently has a relative humidity at the safe level (below 30 per cent). In fact, in Ordnance equipment where "breathing" and condensation occur, rust and corrosion have been worse in some depots in dry areas than in other parts of the country. Unfortunately also, the relatively dry areas are sparsely populated and are relatively inaccessible, increasing the difficulty of rapid redeployment during emergency, after concentration in such localities. Fortunately, "canning" permits independence of locality, since corrosion factors are eliminated, thereby permitting strategic deployment of fighting equipment according to the demands of the situation. Such localities may even include advance bases, on tropical islands, in the Arctic, or in the Canal Zone, without imposing any maintenance burdens.

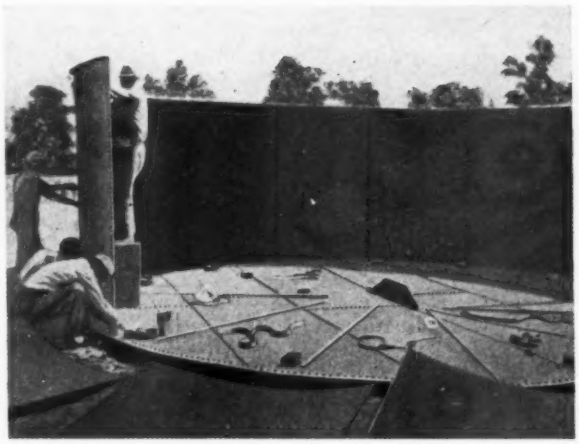


Photo No. 4. Gasoline storage tank for storing artillery.

A plastic form of protection of the sealed type has been developed, known as strippable film* to be used for storage of equipment during comparatively short periods, such as three to 5 years. This plastic hardly is adequate for indefinite long-term storage, but appears to be one of the most promising means of preserving matériel for interim storage. (See photo number 1.)

In order for rust or corrosion to occur, it is necessary that both moisture and oxygen be present. However, if the moisture content is very low (below 30 per cent relative humidity), no deterioration of metals is to be expected.

The cans are actually metal packages of the following types:

(a) Hermetically sealed steel containers filled with either dry air or nitrogen; or in some cases a dessicant such as silica gel, is placed in the container to absorb the moisture.

(b) Aluminum containers connected to the atmosphere through a breather which balances the pressure and dehumidifies all air entering the container. It will be noted in photograph number 2 that this type of container will permit the wheels to remain in place on the gun carriage outside the can during transportation, so that it is truly a dehumidified warehouse on wheels.

(c) Steel igloos fabricated from sheet steel originally intended for bomb bodies. In this type of container can be packed, for example, one 240mm howitzer on wagon,

Above: Photo No. 2. Aluminum "warehouse on wheels."

Below: Photo No. 3. Igloo fabricated from sheet steel.

*See "Live Storage" in the November-December, 1945, issue of The CAVALRY JOURNAL.

and in addition to this, 12 75mm howitzers. (See photo number 3.)

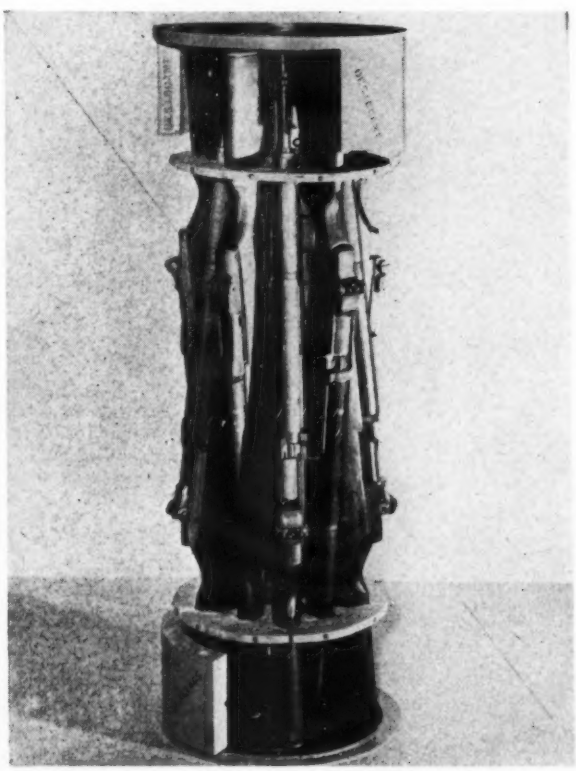
(d) Government owned gasoline storage tanks up to and including tanks of 55 feet in diameter are also contemplated for storing artillery and tank and automotive equipment. (See photo number 4.)

Both the igloo and gasoline storage types are either statically or dynamically dehumidified. In some cases the use of a vapor phase inhibitor is being tried.

The proposed container for packaging .30 caliber M1 rifles and M2 carbines (see photo number 5) for long-term storage is a welded steel drum 38-13/16 inches long, with a diameter of 14⅛ inches. Ten carbines are disposed symmetrically in a welded carrier assembly which is fabricated from steel stampings and pipes or tubes. The carrier assembly is provided with a handle to facilitate removal from the container after it is opened. Glass fiber material is used in several locations in the assembly for cushioning. The carbines are secured in place in the carrier assembly by stamped end pieces and steel bands.

Provision is made in the carrier for 10 slings and for sufficient dessicant material to maintain a relative humidity not in excess of 30 per cent over the range of – 56 degrees F to + 160 degrees F. The atmosphere of the container will be air. The carbines will be coated with a preservative oil, conforming to U.S.A. Spec. 2-122.

Photo No. 5. Container for storing M1 rifles.



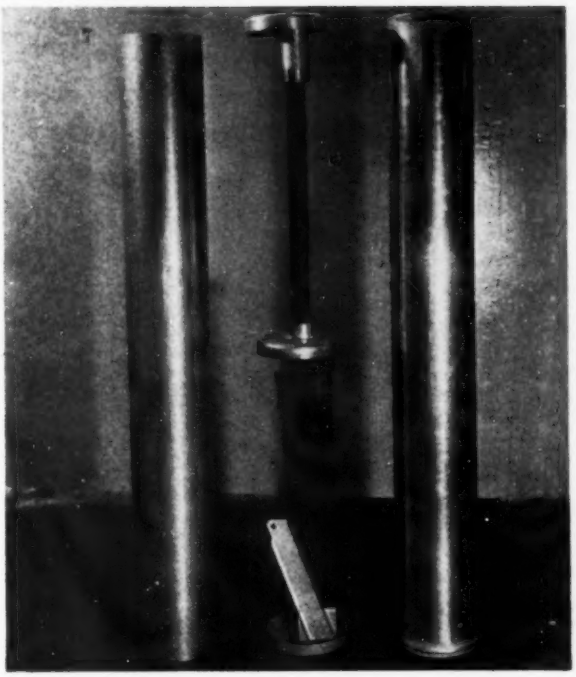


Photo No. 6. Container for storing machine gun.

It is planned that the final assembly of carbines in the container will be carried on in a room with a temperature of 70 degrees F and a relative humidity of 40 per cent. The cover of the container will be seam welded after the carbines are in place to form a hermetical seal. The slings will be treated before being enclosed in the container. Also, the carbines and magazines will be dried in an oven before being dipped in warm oil.

The gross weight of the container is approximately 106 pounds. This compares favorably with a comparable weight of 98 pounds for the regular export pack heretofore used for 10 carbines. It is estimated that the cost of packaging the carbines in the proposed container will be approximately $2.00 per carbine. The comparable cost of packaging in a conventional export pack would be approximately $1.00 per carbine. However, it is believed that superior protection afforded by the hermetically sealed container far outweighs the additional expense.

The container proposed for long-term storage of the .50 caliber M2 Browning aircraft basic machine gun, is a welded aluminum cylinder 59⅜ inches long by 7¾ inches in diameter. (See photo number 6.)

One machine gun is mounted in the container by suitable support members. Provision is made within the container for dessicant material sufficient to maintain a relative humidity not in excess of 30 per cent over the range of – 65 degrees F to + 160 degrees. The atmosphere of the container will be air. The machine gun will be coated with protective oil conforming with U.S.A. Spec. 2-122. The final assembly of the machine

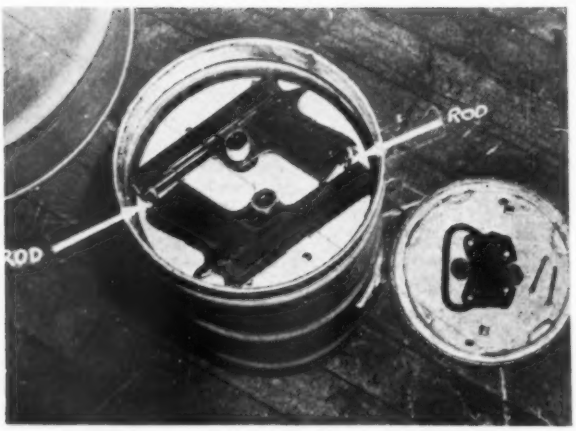


Photo No. 7. Packaging method for .45 caliber pistols.

gun in the container will also be carried out in a room with conditions as outlined for the carbines.

The cover of the container will be seam welded after the machine gun is in place to form a hermetical seal. The end caps of the container are assembled with end dished inward in order to provide means for readier handling of the container. The gross weight of the loaded container is 80 pounds. The corresponding weight of the conventional export package for the .50 caliber aircraft machine gun is 104 pounds. It is to be noted that a substantial reduction in weight has been made in the use of the aluminum container. The estimated cost of "canning" machine guns in the proposed container will be approximately $14.00 per machine gun in lots of 25,000, whereas the present standard export package would cost approximately $10.00 per machine gun.

The particular method used to pack the .45 caliber pistol is shown in photographs number 7 and 8.

The superior protection afforded by the hermetically sealed container far outweighs the additional expense. The metal type of container may be stored in the open indefinitely with only nominal surveillance, whereas the conventional wooden boxes would deteriorate under average conditions in this country. In the tropics or in sub-tropics, the organic material in the conventional export boxes would be subject to attack by insects and mold; whereas the metal container with a suitable preservative would furnish adequate protection over a period of years with normal surveillance.

Strategically a number of important observations are made possible of attainment by the adoption of metal containers. First and foremost, the adoption of the container will make it possible to remove reserves of machine guns, etc., to any point in the world to storage out-of-doors and so stored will be in a completed assembly condition ready for action immediately upon removal from the container.

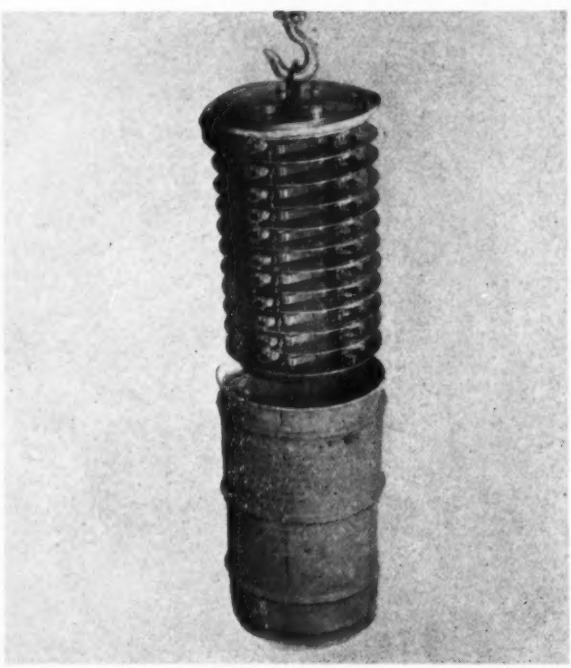
Needless to say, it will be possible to redistribute the reserves of machine guns, pistols and revolvers, so protected, at any time, in any manner designated by strategic and tactical considerations. Assembled reserve stores may be removed to a different theater or they may be widely distributed to any theater to minimize the possibility of destruction by surprise attack. Wide dispersal would not be possible in a fluid situation if the containers did not provide substantial protection during open storage with little surveillance.

The question naturally arises as to what fighting equipment will be put into the cans. Experience has taught that advances in weapons are relatively much slower than advances in transportation. Transport vehicles which follow commercial practice will not be canned. Weapons in most cases will be canned.

The costs involved in "canning" are a vital consideration. Study of the problem has proven that canning is actually the cheapest way of preserving Ordnance equipment for long periods, such as 25 to 50 years. Figures now available indicate that the cost of canning to preserve the matériel for this long period will be up to 5 per cent of the value of the matériel. This cost should be the only cost involved, as further upkeep and care are eliminated through this new process.

It should be pointed out that huge sums are invested in Ordnance items. A 90mm gun on carriage M1A1 costs about $40,000 and a 40mm gun with director costs about $17,000. If the traditional method of storage were used at a cost of $1,000 to $5,000 per overhaul, these weapons would cost more in overhaul than their value in 25 years. By canning, it is actually possible to preserve for 50 years a newly overhauled gun for less than the cost of one overhaul.

Photo No. 8. .45 caliber pistols ready for storage.



Where Is That Storm?

Spherics Can Tell Us

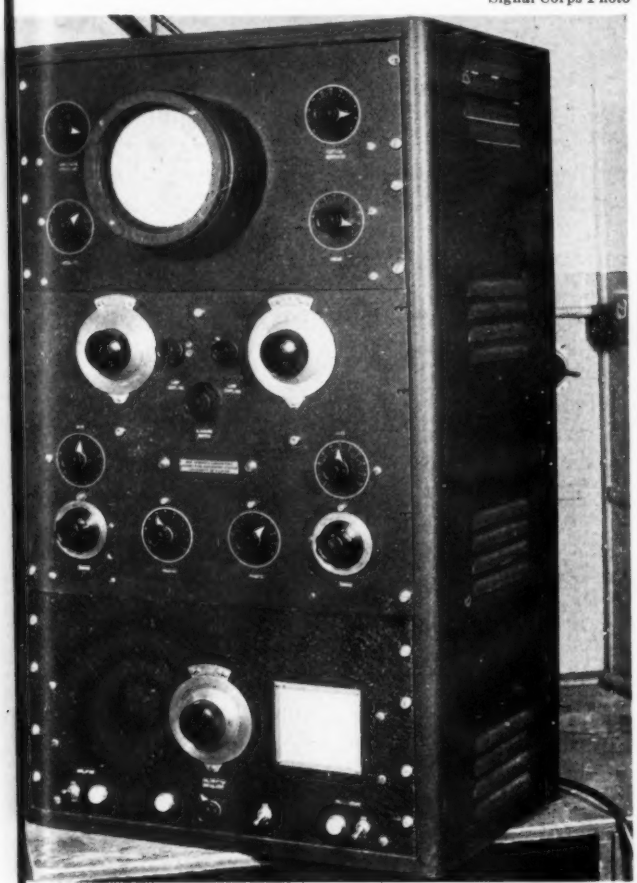
by Signal Corps for the Cavalry Journal

A NEW field of electronics now enables weather forecasters to plot the locations of distant storm centers across thousands of miles of ocean. This is accomplished through the long-range detection of static electricity in thunderstorms, cloud masses, or rainfall.

Spherics is the name for the new electronic, storm-detection technique, and of the static bursts on which it relies. Spherics is based upon the principle that most atmospheric disturbances are accompanied by spheric discharges, and that when these are detected from a distance, they may be assumed to indicate the existence of a storm. Meteorologists thus are able to plot the locations of storms over large areas without making on-the-spot observations.

Since the science of weather forecasting necessitates keeping track of the current weather over wide areas (including oceans, polar wastes, and enemy-held territory), where maintenance of weather stations is difficult or impossible, the acquisition of this data by a few conveniently located spherics stations may effect a significant increase in the accuracy of weather forecasting throughout the world.

Direction Finder and panel layout of "Storm Detector."
Signal Corps Photo

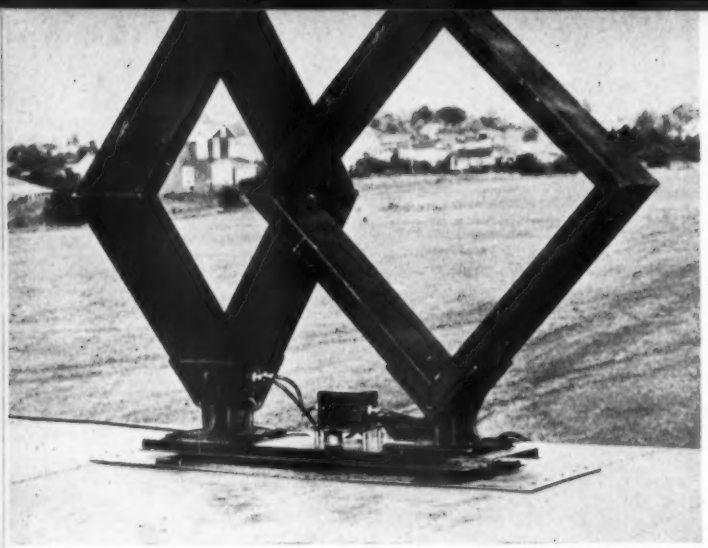


The long-range detection of spheric impulses, upon which the new technique depends, is accomplished by means of a *static direction finder,* which is comparable to the standard radio direction finder in that it uses directional antennas to determine the precise direction to the source of a received impulse. Unlike the more elementary radio direction finder equipment, the static direction finder antennas are nonrotating, and the direction to the source of a received signal is indicated by a flash on the face of an oscilloscope.

The static direction finder consists essentially of two crossed loop antennas, powerful amplifying circuits, and the oscilloscope. The spheric impulses received by the antennas are amplified and applied to the plates of the oscilloscope to create transitory flashes. The position of the flash on the face of the 'scope indicates the direction of the static source. When the direction of the static source is known in relation to two or more such receivers, the location of the atmospheric disturbance may readily be plotted on a map by means of triangulation.

At intervals since June 23, 1944, the Signal Corps has maintained an experimental spherics network covering the western portion of the North Atlantic. This service is credited with having contributed materially to the safety of air flights over the Atlantic. The three initial stations in this Atlantic Coast Network were located at the Signal Corps Engineering Laboratories near Red Bank, N. J.; the University of Florida at Gainesville, Florida; and on the island of Bermuda. A fourth station, sited near St. Johns, Newfoundland, was later added to extend the range of the net and check the accuracy of fixes made by the other stations. Communication between the several stations was maintained by mobile radio sets mounted in 2½-ton trucks. There was no "net control station" as such; the various stations alternated on reporting their observations, and the plotting was carried on at each station.

To verify the data compiled by the Atlantic Coast Network, a program of aerial reconnaissance was conducted over the North Atlantic for several months. Two



Signal Corps Photo

Loop antennas, bases, and buffer assembly of finder.

B-17 bombers fitted with weather equipment and manned by specially trained crews, made regular flights during which weather observers recorded all meteorological phenomena every 15 minutes. In the course of 50 flights, 81 per cent of all data in the flight path compiled by the network were verified by "significant weather" within 100 miles. The minimum dependable range of the individual direction finders was found to be about 2,000 miles; the range of the network, of course, was limited to the range at which three or more stations could take bearings on the same spheric.

Additional spherics networks were later established to cover the Caribbean Sea and the Western Pacific. Experience showed that (1) the spherics technique was not as effective in tropical climates as in temperate regions; (2) that nocturnal observations were less accurate than those made in the daytime; and (3) because of the comparatively low frequency of spheric impulses, deflection of the ground wave causes a considerable factor of error, especially in coastal locations. Another element of error results when the direction finders pick up low-frequency communication transmissions simultaneously with spheric impulses.

The spherics direction finders currently used by the army are based upon a design developed by physicists at the University of Florida. The basic set has been redesigned by the Signal Corps for increased ruggedness and adaptability to military use. Both sets weigh about 450 pounds. The frequency range of later sets was increased.

Most radio direction finders are designed to detect continuous wave signals which are sufficiently enduring in time to permit the determination of direction by rotation of an antenna. The two loop antennas are erected at right angles to each other in such a way that the plane of one is perpendicular to the north-south direction, and the plane of the other is perpendicular to the east-west direction. Each antenna consists of 400 turns of wire wound inside a waterproof aluminum shield.

The loop antennas are especially suitable for spherics work because of their directional characteristics and sensitivity to low frequency signals. A signal arriving from a direction parallel to the plane of a loop produces a maximum response, while a signal from a direction at right angles to the loop plane yields no response. When the loops are mounted at right angles to each other, signals arriving along the ground produce in each loop a voltage the value of which is determined by the strength and angle of approach of each received signal.

The output voltages of the two loops are amplified to the point where they are strong enough to deflect the oscilloscope electron beam, which produces a glowing spot when it strikes the fluorescent screen of the tube.

Through a process of applying voltages, the orientation of the line on the oscilloscope is made the same as the true azimuth of the atmospheric disturbance which caused the signal.

Since the provision of a high degree of selectivity in the amplifying systems of a spherics direction finder would decrease rather than increase its efficiency, interference is a major problem. Undesired signals, which cause interference, result from such man-made static sources as ignition systems, electric arcs, and motor commutators, or from low frequency communications transmitters.

In view of the brief duration of the oscilloscope flashes, a certain element of error is inherent in the instantaneous visual reading of the directional bearings. The Signal Corps is attempting to overcome this problem by developing auxiliary photographic equipment which records the oscilloscope indications on 35mm film. This equipment includes a motion-picture camera through which the film is drawn continuously at a speed of one to 5 inches per second, and a continuous action developer which automatically processes and dries the exposed film received directly from the camera. The film is then projected upon a viewing screen. The camera action is synchronized at all stations of the spherics network by a radio timing unit which produces timing pulses, accurate to within one part in 50,000. This auxiliary photographic equipment is still in the laboratory stage.

The results achieved in an exploratory observational program on interpretation of spheric records, conducted by the University of New Mexico under contract for the Signal Corps, indicate that significant improvements in spherics techniques may soon be possible. Through a study of photographic records of spheric wave forms, the New Mexico researchers found that approximately 5 per cent of the forms have simple repeated patterns, which can be analyzed. A study of the time intervals between these repeated patterns gives evidence of a ground wave and a series of sky waves which bounced back and forth between the earth and the ionosphere as many as 7 times. It is possible thus to calculate both the height of the ionosphere and the distance of the spheric source from the length of the intervals. These results point to the possibility of single-station location of thunderstorms over large areas.

Greatest Smoke Screens in History

*by Lieutenant D. Wilson MacArthur**

THE immense development of air power, both for reconnaissance and for bombing attack, created an urgent need in Britain and abroad for some means of hiding vital war targets and troop movements.

Camouflage, even carried to great lengths, was not enough; the most expert camouflage can often be detected by trained eyes, and the camouflage that will defeat the normal eye is not always effective against the color-blind eye of a camera.

The answer was the smoke screen, used by navies ever since the introduction of steam. Its first obvious application was in protecting harbors and vital war factories from enemy observation and attack. For this purpose the ack-ack screen was devised.

The ordinary orchard heater furnished the basis for research into the production of smoke on a large scale, and after various modifications it emerged as the first smoke generator, producing a dark oily smoke. Next came the larger Haslar smoke generator, also oil burning, and large numbers of these were deployed at British ports and inland. By this means whole areas could be covered by an impenetrable cloud of smoke, through which it was impossible to detect the location of shipping, port installations, armaments factories or dumps. There was, of course, one serious objection. Thick clouds of sooty, oily smoke made life extremely uncomfortable for everyone in the area.

At the same time, research was going on into other types of smoke, and the "chemical pot" was developed. It consisted of a canister containing chemicals which, upon combustion, produce a thick, white smoke. It is ignited with a match and, once ignited, the combustion continues of its own accord.

Another type of chemical "smoke" generator contains fuming acid, forced out under pressure, spraying a liquid which immediately turns into a white fog. Smoke liquids could be used by aircraft for laying screens, while smoke bombs of the chemical type could be shot from mortars, the flash of the propellant igniting them. Various types of smoke floats were also devised for use from ships. Chemical smoke, however, had one great disadvantage; although not so unpleasant as dark oil smoke, it was apt to cause a cough, and men could not remain in it indefinitely. Finally, the American Esso and Besler machines were introduced. These use a special oil which is forced out into the air and immediately turns into a white fog which is very persistent and, at the same time, non-irritant.

Thus, smoke and fog were used in many different ways, ranging from the small smoke bomb, fired from a hand-carried mortar, for immediate protection by the infantryman, and the long-range smoke shell used by artillery for providing cover for advanced units or spotting the fall of shot to the full-scale screen which covered many miles, for ack-ack or tactical purposes.

Apart from the screens laid down to cover harbors and inland targets in Britain, one of the most spectacular uses of smoke was in beleaguered Malta, where the enemy could indulge almost at will in short-range daylight bombing.

On May 10, 1942, H.M.S. *Welshman* docked at Malta with a particularly valuable cargo, which included smoke apparatus. Enemy attack was expected within a very short time, and a smoke screen was immediately organized. It was manned largely by survivors of recently sunk vessels—whose reward was to be a passage home in the *Welshman,* if she survived!

The first attack came, just one hour after she had docked; but by then the screen had become effective, and the enemy dropped their bombs blind through an impenetrable barrage of smoke that hid the target completely. She was not hit. Three more attacks were made at short intervals; but the screen was maintained, and the *Welshman* remained untouched.

From this small beginning at Malta, 7 frontages were soon developed which covered between 7,000 and 8,000 yards, and eventually a coverage circuit of from 5 to 6 miles, which included the whole of the Grand Harbor, was obtained.

This great screen was fully operative by the time the August convoy fought its way to the island, and the ships had the fullest protection when they arrived.

By the summer of 1942 in the Middle East Theater large smoke screens were prepared for the protection of important ports and inland targets, particularly at Alexandria, Suez and Haifa. This method of frustrating enemy observation may have been partly responsible for the fact that no heavy attacks ever developed on these ports.

Smoke was to play a still more vital rôle in the great North African campaign, when many severe attacks, particularly at night, were launched against the harbors seized by the Allies, which included Philippeville,

*British Royal Naval Reserve; Scottish novelist.

Bougie, Bone and Algiers, and within the next 6 months, Sousse, Sfax, Bizerta and Tunis. By November, 1942, 10 major screens were operating and smoke became a first priority. As each port was captured, the screen was prepared and was in full operation within a day or so.

This led to the provision of ack-ack screens at every port taken in the Sicilian and Italian campaigns. All the stores and personnel were ready before the assault on Sicily began, for by this time smoke had been accepted as an essential part of warfare. In the short time between the first assault, in July 1943, and the end of the year, no fewer than 8 major screens were functioning.

Important as these ack-ack screens were, smoke was to play a still greater tactical rôle in the war. In the Dieppe raid the skilful use of smoke helped the Navy put the troops ashore, and withdraw them afterwards. The ships were able to approach within 600 yards without meeting any well-directed fire because the enemy was compelled to shoot blind into a great wall of smoke. Smoke was provided not only by the Navy but also by the Royal Air Force, who used smoke bombs, and smoke screens laid at high speed by the aircraft. Under such a cover the assault craft stormed in, while the tank landing craft were able to retire into the main screen whenever the fire from the shore became too accurate. When the time came for the withdrawal, smoke screens laid by the aircraft provided a cover under which the craft took the men off the beaches. Without this aid it might well have been impossible to reëmbark so many men.

At Salerno more extensive use was made of smoke. As soon as the troops had landed, they laid out screens on all the beaches to cover the assembly points and the landing of stores.

The battle of Cassino was planned with smoke as a major tactical weapon. From Monastery Hill the enemy had perfect observation of troop movements, artillery concentrations, and all other preparations for an assault. It was essential to discount this heavy advantage, and a great smoke plan was devised. For this the British chemical pot was used, and complete cover was provided for the crossing of the River Gari. When the assault developed, a great screen entirely covered the movements of the troops along the whole of the British and Polish fronts.

It enabled the engineers to throw bridges across the Gari for armored troops, and a continuous haze was maintained over the area in which the artillery was deployed. Afterwards the German commander stated that smoke had been used on an unprecedented scale, and compelled his gunners to shoot blind.

These experiences and developments led eventually to the greatest operation of all, the invasion of northwest Europe. First, immense ack-ack cover was provided at all the points of embarkation and over concentration of troops and matériel in Britain. A similar cover was provided after the landings to protect the Mulberry harbor and other disembarkation points. Smoke was used in the same manner in the landing on the south coast of France.

The culmination of this type of warfare, however, came with the preparations for the crossing of the Rhine. The whole of the operation of assembling troops and matériel for the crossing was completely covered by a gigantic smoke screen, and when the assault was launched the screen extended over a continuous front of 68 miles—indubitably the greatest in the history of war. Between 2,000 and 2,500 men were employed in laying and maintaining this vast screen, in addition to the great transport columns which brought up the equipment and materials.

A tactical screen intended to raise a wall of fog behind which troops and artillery and tanks can be deployed, involves a vast expenditure of labor and material, costing about 4 tons of chemicals per mile of front each hour.

Thus the tactical smoke screen played its vital rôle in many battle zones, and in at least one of these it proved completely indispensable. This was in the Anzio beachhead, where, after the enemy had contained the beachhead, the whole area occupied was under direct observation and artillery fire from the ring of hills surrounding it. Without smoke, it would have been only a matter of time, and very little time, before the beachhead would have become untenable.

Immediately after the assault, however, an ack-ack screen was laid to cover the shipping in the bay, and at the same time energetic steps were taken to protect the troops and artillery. Otherwise the whole area would have been at the mercy of the German guns, which could have picked off lorries moving along the roads, blasted troop encampments, and smashed every concentration inside the beachhead. The screen which was laid down, and maintained throughout the hours of daylight, covered a wide semicircle with a radius of three miles or more, and thus prevented observation of supply dumps and troop movements inside the area.

In the Apennines a different record was set up in the maintenance of smoke screens. Here, where perfect observation would otherwise have been possible, a screen was maintained throughout the daylight hours for 4 months to protect vital supply routes and artillery deployment areas. Much of this time the chemical pot was used, but it caused a good deal of throat irritation, and men on patrols often gave themselves away to the enemy by unavoidable coughing, so the white oil fog type of generator was introduced in the later stages.

The development and employment of smoke and fog screens, far beyond anything ever achieved by the enemy, played a vital part in protecting the harbors and factories of Britain, and in prosecuting the war in the Mediterranean and northern Europe. It undoubtedly saved not only vast quantities of matériel, but the lives of many thousands of soldiers who would otherwise have been at the mercy of German guns and planes.

A Chemical Empire Falls*

by Volta Torrey

NAZI Germany was a chemical empire that rose swiftly, fell suddenly. Its history has been written now by scientists. Civilian chemists and engineers of the U. S. Strategic Bombing Survey have unraveled this unprecedented empire's inside story from secret German records, interviews with German authorities, and extensive surveys of the bombed-out plants and laboratories of the Reich's oil, chemical, rubber, and explosives industries.

These industries were the basis of Hitler's power. They produced the fuel for his war planes, U-boats, tanks, and V weapons. They supplied substitutes for the hundreds of natural products which the British blockade kept him from obtaining elsewhere. By producing innumerable items, mainly from coal, air, and water, these industries enabled the Nazis to blitz and defy much richer nations.

Unlike America, Germany had very little natural petroleum. When Hitler invaded Poland in 1939, he had on hand only enough aviation gasoline to fight for about three months, and only enough automotive gasoline and nitrogen for explosives to last about two months. New fields discovered near Vienna during the war yielded more crude oil, and additional supplies and refineries were stolen from other countries. Even so, more than four-fifths of the Nazis' gasoline, 99 per cent of their rubber, and all of the nitric acid used in their explosives came from Germany's plentiful supplies of coal.

Friedrich Bergius, a Nobel Prize winner, found a way in 1920 to make liquid oil molecules by splitting the complex molecules of coal and forcing hydrogen into them. Since the hydrogen had to be used under pressures up to 10,000 pounds per square inch and at high temperatures, building the compressors used in Bergius plants was a task comparable to manufacturing naval guns. Fifteen times as much steel was required for synthetic oil plants as for ordinary refineries, and the Germans devoted as much steel to the construction of such plants between 1937 and 1944 as would have been needed to build a battle fleet four times the size of the U. S. Navy in 1940.

Another prewar development, the Fischer-Tropsch process, enabled the Germans to take molecules of carbon monoxide and hydrogen from coal and build up various oil molecules. The products obtained by this synthesis had special properties, for which many chemical uses were found. But the more complicated Bergius method was used more extensively, because it was the only one by which great quantities of aviation gasoline could be produced.

Both processes were expensive; gasoline produced synthetically costs from four to five times as much as gasoline obtained from crude oil. The coal needed to make enough gasoline to fill the wing tanks of a Flying Fortress would heat an average-sized home in New York all winter, and an average-sized German synthetic oil plant consumed more electricity than an American city of 250,000.

Regardless of the cost, the Nazis set out long before the war to make themselves independent of other nations. Powder and explosives plants, which had been trimmed down to reasonable proportions by the Treaty of Versailles, were expanded with the help of a state-owned corporation created secretly in 1932. Synthetic rubber production was increased nearly 2,000 per cent in three years. And the production of synthetic liquid fuels was encouraged by slapping a tariff of 30 cents a gallon on gasoline in 1937, and by lending money and guaranteeing prices to the chemical and coal concerns.

Germany's well-developed chemical industry, with 12,000 qualified chemists on its pay rolls in 1937, had grown up in the Ruhr, along the Rhine and in Central Germany, in or adjacent to the coal fields. The I. G. Farbenindustrie held the patent rights to the Bergius process and Ruhrchemie had the rights to the Fischer-Tropsch process. The old plants of these and other firms were expanded, and new plants were erected in the same areas. Thus, the oil, chemical, rubber, explosives, and other industries of the Reich were interlocked not only by their mutual dependence on coal but also historically, geographically, and mechanically.

The gigantic chemical empire that rose under Hitler's regime is described, in fact, as an "octopus" in the official report of the Oil Division of the Strategic Bombing Survey. Its body was the gas-generating plants, and its arms were the many plants that used those gases to produce a long list of chemical products.

This octopus continued to grow, despite many small aerial attacks, until the spring of 1944, when it became the target of an intensive, strategic bombing campaign by both the RAF and the 8th Air Force. It was well defended. Huge, reinforced concrete "dog houses," and brick blast walls shielded the vital parts of the plants; and bombardiers often were deceived by decoy plants—which had wooden platforms built to simulate the appearance of oil tanks, and fireworks that could be set off to make observers think that real plants were being bombed.

*Reprinted by courtesy of *Popular Science*, January 1946.

The bombs used against the synthetic oil targets in the first big strategic attacks were too small. People were killed, pipe-bridges, utility lines, and sewers were damaged, and operations were halted, but the plants recuperated quickly. The first aerial attacks, in other words, merely damaged some of the arms of the octopus. But later, as bigger bombs were developed and hurled against these targets, the gas-producing facilities which were the heart of the whole group of industries were hit and shattered.

Nazi authorities saw what was coming a year before the war ended. The Plans Division of the German Air Force reported in 1944 that "the greatest danger lies in the threat to the fuel supply," and Albert Speer, Reichminister for Armaments and War Production, confidentially warned Hitler that "if the attacks on the chemical industries continue . . . those very materials essential for continuation of modern warfare will be unavailable in the most important fields."

Edmund Geilenberg, a former miner who had worked his way up to be manager of the Brunswick Steel Works, was made General Commissioner for Immediate Measures. These measures included the swift, energetic repairing of bombed-out plants, and steps to disperse oil production facilities and move plants underground. Geilenberg was told by Hitler to tackle the work "with a generous supply of manpower and material and reckless energy."

Exactly one year after he was given almost unlimited authority, American occupation forces found Geilenberg repairing bicycles. At one time, however, he had commanded a labor force of 350,000 persons, and the speed with which his crews repaired the damaged plants made it necessary for the airmen to attack oil targets time and time again.

The most grandiose of the Nazi plans to save their chemical industries were those which called for hiding small plants in the woods throughout Germany, where they would be as invisible from the air as the stills of Kentucky moonshiners, and moving enough additional plants underground to keep the Luftwaffe in the air.

In the opinion of the Strategic Bombing Survey's experts, the idea of moving fuel production underground was feasible. Properly designed and ventilated oil plants could be operated underground with reasonable safety. But the German's underground and dispersal program was never completed. It would have required a full year's labor by at least 200,000 men, more than were employed in the whole oil-refining industry of the United States in 1944, and the Americans and Russians closed in on the Nazis too fast for them to prolong the war this way.

Even if they had succeeded in moving colossal plants underground, the destruction of railroads and sources of power on the surface would have made the plants of little value. Lack of storage space would have kept them from running at full capacity without adequate, regular, transportation service. With no more steel than was used to repair damaged surface plants, however, the Germans could have run pipelines to refineries from oil fields and extended a network of distribution pipes throughout Germany. They might then have been able to supply their armed forces with a respectable quantity of oil products despite the strategic bombing.

Instead, aviation gasoline became so scarce that the Luftwaffe had to stop training pilots in September 1944. Men with only 40 to 45 hours of flight training were sent into combat, countless planes were lost because of the pilots' inexperience, and hundreds of planes were grounded.

Automotive gasoline became so scarce that the speed limit was set at 17 miles an hour and every trip of more than 60 miles had to be approved by a commanding general. Although 1,200 German tanks were massed against the Russians at the Baranow bridgehead in 1945, the Germans had only enough fuel to refill the tanks two or three times. On other occasions, tanks and armored vehicles were moved to the front by oxen. Gas generators which made it possible to use coal or wood as fuel were put on 100,000 vehicles a year before the war ended and had even been put on 50 tanks by V.E. Day.

High explosives simultaneously became so scarce that thousands of shell cases were never filled, and rock salt comprised up to 70 per cent of the contents of others. Such shells boosted the morale of retreating German troops by making loud noises, but were only about 30 per cent as effective as properly filled shells. Nitrogen intended for use as fertilizer was diverted to munitions, but even so there was not enough. Antiaircraft ammunition became so hard to get, according to General von Axthelm of the Flak Artillery, that battery commanders were told never to fire at an enemy airplane unless, first, they were sure it was going to attack the target they were supposed to defend and, second, they felt sure they could hit it.

"In modern war," according to no less an authority than Major General Henrici, the German Army's Chief of Ordnance, "a country's ability to produce munitions decides victory or defeat. The destruction or crippling of the munitions industry is the key to victory."

The destruction of Germany's munitions industry was a by-product of the strategic attacks on synthetic oil targets. American and British air power, in fact, caused the whole German chemical empire to collapse in the last few months of the war like the One Hoss Shay.

This was before the first atomic bomb burst. How, nowadays, can any nation protect its vital war industries from air power?

Aerial and passive defenses far superior to those that Germany had would still leave American industries vulnerable, their report concludes. The best defense is the prevention of attacks.

Some Features of Modern Warfare*

by Major General M. Galaktionov

THIRTY years ago Germany unleased the First World War, with world domination as its aim. The rules of imperial Germany and their general staff made long and careful preparations for that war and reckoned on terminating it swiftly by defeating France, Russia and England in quick succession. However, even in the first few months a fatal defect of German strategy was revealed, namely, crass overestimation of Germany's strength and underestimation of the strength of her opponents.

The Battle of the Marne and the Russian offensive in East Prussia led to the collapse of the Germans' plans and the protraction of the war. This, in turn, led to an increasing change in relative strength in favor of the Allies and to the detriment of Germany, which began to feel all the handicaps of a war on two fronts.

Germany was vanquished in the field, but the victors failed to reap the full fruits of their decisive triumph. The "appeasement" tendencies which at one time dominated West European policy enabled the Germans to prepare for and launch a second World War.

Hitler and his clique, whose aim was to bring all human society under German domination, first turned their war machine against the countries of Western Europe and registered a number of major successes. Then Hitler Germany treacherously attacked the Soviet Union. The Red Army administered a series of defeats to the German-fascist armies which radically changed the course of the war. By the combined blows of the Red Army and the Allied Armies, Nazi Germany has been brought to the brink of disaster.

In the past 30 years, we have known two world wars, the experience of which furnishes a foundation for the modern science of warfare. But the question arises: is it right to draw general conclusions from two wars that in many respects differ so radically? In other words, how instructive are the lessons of the First World War today?

The answer to this question was furnished in the course of this war. The Nazi adventurers, while they exploited for their criminal war a number of advances in armaments—advances which, incidentally, did not originate in Germany—actually speaking, had no scientifically grounded system for conducting operations.

Failure of Blitzkrieg

The Nazis rejected positional warfare in favor of blitzkrieg. But the German armies, attacking with the aim of inflicting lightning defeat on the Soviet Union, were beaten by the Red Army. Thereupon the Hitlerites changed their line, rejected blitzkrieg and espoused positional warfare. Again the Germans were defeated by the Red Army. These fluctuations, incidentally, show that Hitler and his clique crudely misinterpreted the lessons of the war of 1914-18.

But to show where they blundered, we will deal with some of the features of the First World War.

The first distinguishing feature, which manifested itself in the very early stages of the war, when it still bore a maneuvering character, was the fire power resulting from quantitative and qualitative development of artillery and firearms of all types. Most striking of all was the use of fire power as a means of defense, largely due to the development of automatic firearms. The heavy machine gun, with its faculty for creating a solid and impenetrable zone of fire, became the chief means of defense of fortified fronts. Flanking machine-gun nests in the forests of Caillet, on the heights dominating the approaches to Fort Veau, kept the Germans besieging Verdun at bay for several months. The pillbox or concrete firepost likewise originated in Verdun. For many weeks German artillery was unable to locate and destroy these tiny points. Machine-gun fire was supplemented by artillery barrage. The attacking infantry sustained immense losses and in many cases was unable to reach the enemy's first line of trenches.

War Assumes Positional Character

The effect was to create solid and stable fronts traversing the entire theater of hostilities and behind which the infantry and artillery were ensconced. The war assumed a positional character. Both belligerent sides sought persistently for a way of breaking through into the open and passing to the tactics of movement. An attempt was also made to adapt fire power for offensive purposes, especially the faculty of artillery for demolishing defenses and opening the road for the attacking infantry. Thus arose the tactics of break-through.

Considerable experience was accumulated in the war of 1914-18 in the art of preparing for the carrying out of break-throughs. The concentration of powerful artillery forces, artillery preparation, new methods of firing and creeping barrage were all evidences of the swift development of this powerful arm.

In the First World War considerable difficulty was encountered in developing tactical success into operational success. But here, too, the beginnings of a solu-

*From Krasnaya Zvezda.

tion were found, the full development of which, however, remained a matter for the future. In 1916 the first tank appeared on the battlefield, and in 1918 the Allies launched their offensives with the help of hundreds of tanks and the support of "air divisions."

German war doctrine failed to understand these features of modern warfare. It was extremely one-sided. The Germans' conception of the difference between the First and Second World Wars is very primitive. They held that the first war was exclusively one of position, but that the second was a war of maneuver in which fortified fronts play only a secondary role. They overlooked the fact that a fortified front, and hence fire power, artillery and infantry, played an outstanding part in the first war and that these features would be inherited by the second. They believed that the decisive factor of this war would be mobile formations.

The Red Army drew the correct conclusions from the experience of the First World War. Stalin's school of strategy taught that the form of maneuver that arose in the First World War would be broadly developed; hence the place of honor assigned to tanks and aircraft in our Army. On the other hand, it taught that such features of the first war as fire power, fortified fronts and the necessity of breaking through these fronts would also play a prominent part in the coming war. This explains why mobility and weight of numbers in fire power and maneuver are properly combined in the Red Army, why its artillery received such all-round development and why the fire power of the army increased generally, and why such importance is attached to the infantry. The First World War was not exclusively a war of position; it originated the modern maneuver. The Second World War is principally a war of maneuver, but maneuver combined with powerful fortified fronts. This difference in the character of the two wars was properly appreciated by the Stalin school of strategy.

Now that we can look back on five years of the Second World War, we are able more deeply and correctly to appreciate the experience of the last war. Fire power, fortified fronts and the break-through—those three principal features of the war of 1914-18—have been preserved in this war. This war further developed these features which, in fact, are characteristic of modern warfare generally.

It was already held in the First World War that the break-through, when exploited and consummated, leads to the war of maneuver. This has been corroborated in the present war, not by the Germans, however—who gained their victories at a time when the features of the present war had not yet fully manifested themselves—but by the Red Army in its grand offensive in 1942-44 when fortified fronts already existed.

The tank owed its inception to the positional warfare of 1914-18. Its armor was designed to protect troops from machine guns and its tracks for movement over battlefields crisscrossed by trenches, pitted with shell craters and covered with barbed wire entanglements. The tank became the instrument of maneuver in its new and higher form. The development of tank and mechanized troops capable of exploiting a break-through and conducting maneuvering operations in depth is a new feature of this war as compared with the last.

Another new feature is the extremely rapid and far-reaching development of aviation which, being able to cross fortified lines, attack the adversary's deep rear and strafe installations and troops on the battlefield, is radically changing the methods of warfare.

The gigantic fortified front stretching from the Barents Sea to the Gulf of Finland, from the Baltic to the Carpathians and from the Carpathians to the Black Sea is in itself convincing evidence that the fortified line which appeared in the First World War retains all its significance today. Moreover, the front of the German defenses now pierced and demolished by the Red Army was constructed in accordance with all the rules of field fortification, which have made big strides as compared with the First World War. Fire power has been increased many times over. Pillboxes and bunkers have been supplemented by antitank guns, minefields and obstacles of diverse types. Defense zones now measure scores of kilometers in depth instead of only a few kilometers as in the last war. Furthermore, strong points and fortified lines were prepared deep in the rear.

This powerful defense system was smashed by the Red Army. Of the many achievements of the Soviet science of war, special mention should be made of the supreme skill of our troops in penetrating the enemy defenses. The prime part in this is played by the artillery. A new feature compared with the last war is the combination of fire power and mobility which enables the artillery to escort attacking troops into the depths of the enemy's defenses. Another new feature is the combination of massed artillery and air attacks. Soviet infantrymen armed with tommy guns and light machine guns and escorted by tanks, guns and mortars, solve with consummate skill the most difficult problems which arise in the course of attack and exploitation in depth. Penetrating a defense zone to a depth of 10 or 15 kilometers on the first day of an offensive has become the customary rate of advance of our gallant troops.

As we have already said, the idea of exploiting a break-through in order to turn positional warfare into maneuvering warfare was already contemplated in the last war. But this was only a general idea, which failed to take account of the difficulties involved. For in order to shatter enormous enemy forces stationed along the whole front, an intricate combination of operations of diverse kinds is required which will lead to the demolition of the enemy's entire front and to the defeat of his army formations both in the front and rear. And it is precisely such a combination of successful operations governed by a single strategical plan that we observe in the Red Army's present offensive.

Let us generally and briefly enumerate these operations. They include break-through and its exploitation in depth by mobile forces simultaneously on a number of sectors; disruption of the enemy's rear communications and encirclement of his forces on the main front line and in the rear; demolition of neighboring sectors of the enemy's defenses by attacks from the front, flank and rear; successive development of operations in depth with the object of surmounting the enemy's rear defense lines and surrounding and destroying his forces.

The simultaneous development of powerful attacks along the front and in depth, drives in various directions, continuous harassing of the enemy's flanks and rear, tense fighting to overcome his fierce resistance—all demand high strategical skill on the part of the command so as to lend the mobile operations spread over vast areas a systematic and organized character.

It is impossible to recount here even the most important details of the Red Army's offensive operations in the summer of 1944. But one thing can be said, namely, that in this offensive are combined the advantages of tank and mechanized troops and aviation, adapted to the peculiarities of a war waged on wide fortified fronts and in powerful defense zones. Bold and impetuous maneuvering by mobile forces is combined with methodical and systematic demolition of the enemy's front and secure consolidation of the successes gained on lines carried far to the west.

German Plan for Invading Britain*

DOCUMENTS discovered among the archives of the German General Staff in Berlin have revealed the enemy's plans for the invasion of Britain in the autumn of 1940. The first warning orders for this operation were issued in mid-August about a month after the fall of France.

The forces allotted for the operations numbered 23½ first line divisions, with 17 more in reserve; assuming these to be all at full strength, as they doubtless would have been, and adding the usual proportion of corps and army troops, this would represent a strength of about a third of a million men for the first line forces and a quarter of a million for the reserve—say 600,000 in all. Of the 22 first line divisions, 14 were infantry, 6 armored and two motorized; in addition, there were 1½ airborne divisions, which were to carry out a special operation of their own.

The first line force was to be divided into three armies. The 9th Army on the right, starting from bases on the Belgian and French coast, at Ostend, Dunkirk and Calais, was to land in Kent and Sussex between Margate and Hastings. In conjunction with its operations, an airborne landing was to be made north of Romney Marshes. The 16th Army in the center was to start from the stretch of French coast between Dieppe and Havre, with the British seaboard between Brighton and Portsmouth as its objective, and two airborne landings in conjunction with it were to be made on the South Downs. The 6th Army on the left was to start from the Caen-Cherbourg area and to effect a landing in the vicinity of Bournemouth and Weymouth.

The plan of operations after the securing of the beachheads was to link up the forward troops of the three armies on a general front with the north bank of the Thames estuary about Tilbury across the Gravesend, thence along the ridge of the North Downs southwest to Caterham and west to Aldershot and thence south to the coast about Portsmouth. The 9th Army was then to advance north into East Anglia as far as the Colchester area and the 16th Army into the East Midlands, pinching out London between them, while the 6th Army pushed up the estuary of the Severn. From that line mobile forces were to push further north into the Midlands toward Birmingham and the industrial areas of Lancashire and Yorkshire.

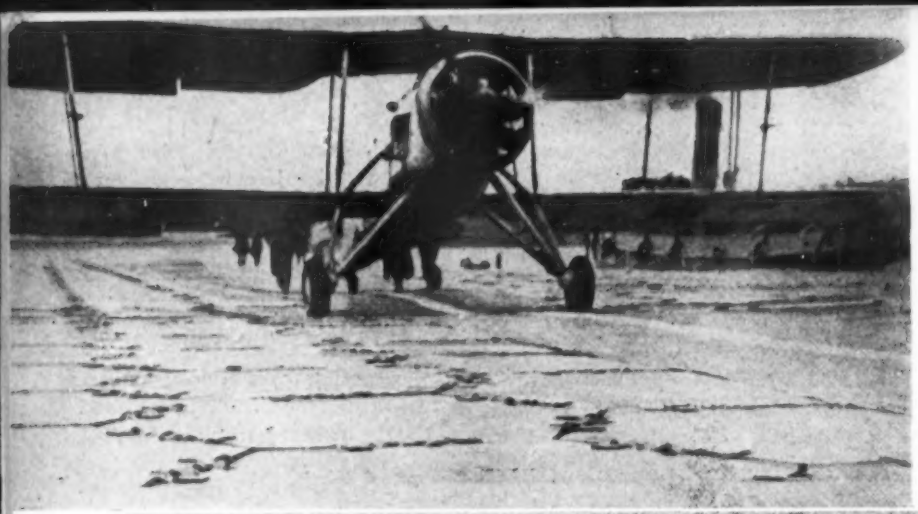
This German force allotted for the invasion of Britain was about the same strength as that used by the Allies later for the invasion of Normandy, though in the latter case the reserves were larger. On the other hand, the forces which Britain had available for defense were pitifully weak. General McNaughton, in command of the 7th Corps, had under him Britain's only completely organized and armed formations—the 1st Canadian Division, part of the 2d Canadian Division, and certain British units; there were a few regular troops and Home Guards, manning the beach coastal defenses, and that was all. The total strength of these forces was probably under, rather than over 50,000 men.

The British plan of defense was for the coastal garrisons to resist as long as possible, making use of such various secret and surprise devices as were available to inflict the maximum losses upon the enemy.

As far as could be foreseen at the time, therefore, the German invasion of 1940, had it been launched, would have been as certain of ultimate success as any operation of war could well be. Heavy losses might have been suffered, but certainly not as heavy as those subsequently incurred in the invasion of Russia in the year 1941 alone. Why the enemy never undertook it, despite the tremendous odds in his favor, of which he must have had a reasonably accurate idea, still remains a mystery. It is probable that his failure to do so was the most fateful of all the many blunders which lost him the war, for with Britain conquered and helpless, Russia could hardly have survived the subsequent attack on her, and America would have been deprived of her only possible forward base from which the reconquest of Europe could have been effected.

*The Tank.

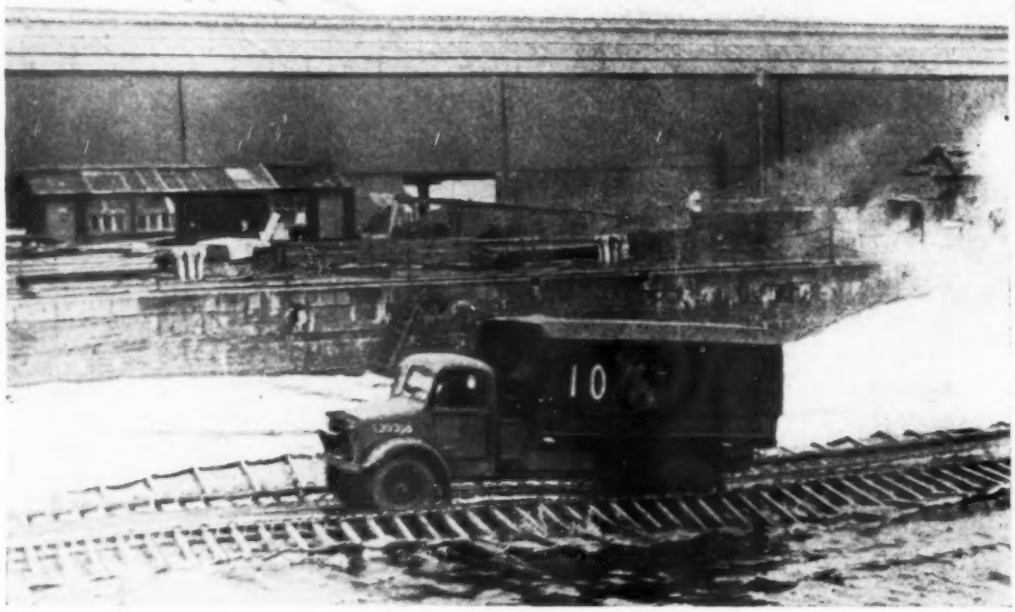
Rolling



Left: The *Swordfish* lands on the *Lily*. Note depression in surface caused by weight of the aircraft.

Above: The *Lily* undulating with the waves caused by a motor launch passing at high speed.

Right: Loaded truck moves along the Swiss Roll while large waves (trough to crest —4 feet) are produced by an M.T.B. racing alongside.



Dynamic Buoyancy ★

BRITISH scientists have discovered a method of increasing the natural surface tension of water to make it technically possible to build a mid-Atlantic aerodrome or a floating cross-channel bridge.

Inventor of these new devices is Mr. R. M. Hamilton of London, who served at the beginning of the war as a Petty Officer in the Royal Naval Patrol Service. The new discovery has been sponsored and developed by the Royal Navy, and brings dramatic dreams within the realms of actuality.

This latest feat in engineering-on-water began when a brain wave sent the inventor motorcycling at 40 m.p.h. along a tarpaulin stretched over a river ford.

In 1941 Mr. Hamilton was turning over in his mind the general problem of floating airports when he realized the simple truth that if he could increase the natural tension of water it would support weights. He then borrowed a length of farm paling and some tarpaulin from a farmer. Bridging a local ford with them, he crossed on his motorcycle. As he crossed, he found that he was being supported on the surface of the water. He also realized that as he went at speed he made a harder surface.

Ordinary tension will support a needle on the water's surface. By putting a flexible synthetic surface on the sea, and by increasing the tension about 400,000 times, it has been found possible to support heavy lorries and aircraft in mid-ocean.

It was not until 1944 that the first practical result of this discovery was employed—the "Swiss Roll" pier, used in the Normandy invasion.

In *Swiss Roll*—a flexible canvas-and-wood jetty—a tension of 18 to 30 tons is applied to any length stretching from ship to beach and enables a laden truck to be driven ashore in safety over the sea.

Some 2,700 feet of *Swiss Roll* were in continual use at the Mulberry invasion harbor at Avranches in spite of the appalling weather conditions encountered there.

The Royal Navy's latest experiments, only recently concluded, with the *Lily* floating airstrip, have been a further development of the same fundamental principle.

Given its name because of its resemblance to a carpet of lily leaves on a pond, *Lily* is a very different proposition to *Swiss Roll*. It consists of numbers of buoyancy cans with hexagonal surfaces, so linked together that they "give" in a controlled manner to the motion of the sea from any direction, yet remain sufficiently rigid to take the weight of a heavy aircraft. These may be used to produce small islands which can be built to any shape or length required, and are easily dismantled, transported and reassembled.

Whereas in *Swiss Roll* tension is applied externally, *Lily's* hexagonal surfaces, when linked together, create their own tension. At present the cans are only 6 feet across and 30 inches deep, but their size could be scaled up to take greatly increased weight.

The Royal Navy's experimental airstrip is the smallest on which practical tests could be undertaken, 520 feet long and 60 feet across. On this an aircraft, laden to 9,000 pounds, has landed and taken off again. A strip of this size can be assembled by 40 men in one hour.

The whole surface of *Lily* is flexible so that it will not break up, but this flexibility is controlled by the use of underwater dampers. The inventor claims that, with the latest type dampers, more than three tons of pressure is required to move the surface at all, and that *Lily* will remain flat in waves up to 36 feet from crest to crest.

The dream of Atlantic aerodromes has seemed unattainable because it has not been possible to build large enough stormproof flat-surface structures. Modern transport aircraft would need a carrier or a strip twice the length of the *Queen Elizabeth*, largest ship in the world. Such a floating structure has hitherto been impractical.

The Navy's new seadrome can be transported in ships and assembled anywhere. With the present size buoyancy can, a *Lily* 2,500 feet long could be transported in three merchant ships.

Lily's possibilities for bridgebuilding are underlined by those responsible for its development.

"To mention a cross-channel bridge immediately places you with straws in your hair," said Mr. Herbert, the mathematician assisting Mr. Hamilton, "but we can say that it would be possible to build a floating bridge 22 miles long that would not break up in a sea."

The principles of *Lily* are so new that it cannot be described in usual terms, and in fact, the British Patent Office did not know in which category to place the invention. Mr. Herbert, who declared that working out the new problems in three-dimensional mathematics was "great fun," likes to refer to it as "rolling Dynamic Buoyancy" or as "a controllable, flexible surface."

★British Information Services.

★ ★ ★ ★

Official U. S. Navy Photo

Underwater demolition team daubing their bodies with a camouflage of aluminum paint before starting their dangerous swim.

They Pioneered To T

by Commander Harold

*Condensed from *United States Naval*

THERE is seldom a job without casualties. On the Balikpapan job, no one was killed, however. Most of the injuries are from near misses by heavy shells, some of them fired by supporting ships, which must continually rake the beach only a few yards from the swimmers. . . . Strangely enough, the swimmers fear snipers less than heavy shells. They frequently see the snipers in the act of firing at them but their bobbing heads present a difficult target and few are injured. It is not extraordinary for a swimmer to receive 25 or 30 near misses from rifle fire in the two hours or less that he spends on the obstacles . . . Swimmers occasionally wear steel helmets if sniper fire is extremely heavy."

The foregoing lines are excerpts from notes forwarded to the Navy Department to aid in describing motion and still pictures taken by Combat Photographic Units of the Underwater Demolition Teams.

The notes gave many other facts essential to correct voicing of the films and the captioning of photographs. Just as matter of factly, they explained that the swimmers did most of their work *20 to 50 yards seaward of the high water mark on the beach; that the beach was narrow with considerable brush along the shore; that most of the fire was machine gun, rifle, and 37mm, although heavier shells from coastal and dual purpose guns were thrown at covering ships.*

To one familiar with the work of the Navy's Underwater Demolition Teams, the notes conveyed a comprehensive picture. To those who knew nothing of their work, as was the case with virtually all folk at home, and even with a large number of people in uniform out in the far places of the Pacific, they would give but an inkling of the story about the officers and men who went to war in blue swimming suits, measuring the depths over fire-swept reefs and beaches or pushing along ahead of them waterproofed packs of high explosives to blast a way for the landing craft.

Good reason the Navy had for not shouting to the world the accomplishments of the Underwater Demolition men. And the last to have sought publicity on their work were the men themselves.

After Tarawa, on to the end of the war, no major landing operation was attempted without reconnaissance, demolition of obstacles if such were present, or both. The Jap had sought to multiply the normal hazard of coral barrier reefs by studding them with great concrete "scullies" reinforced with sharp-pointed rails or logs, with massive log cribs filled with concrete and coral, with sharp-pointed single hardwood logs wedged down into the reefs. In many places he interwound these solid physical obstructions with barbed wire, and frequently tied in antiboat mines among them. With these underwater works the Jap's garrison commanders felt confident that they would be able to trap the waves of assaulting boats and blast them and their occupants to bits. If all of them were not stopped, the Jap commanders apparently felt certain of exacting such cost in blood that an attacker would give up.

If the Navy had not met the problem with its Underwater Demolition Teams, the Jap's reasoning might have borne fruit.

The initial major operations of the Underwater Demolition Teams in the Pacific were highly successful. The amphibious commanders perfected a fire support for these men who went swimming in against Jap defenses in broad daylight that became deadly effective.

After one good example, all the Jap needed to do was to lay traps—antipersonnel mines and other snares specifically designed to destroy the Underwater Demolition men before they could do their work. It was because the Jap failed to take these steps that the Navy kept rigid silence on demolition work. After the swimmers had finished their work and withdrawn with the ships and planes which had laid down fire support, a

ey a Channel okyo*

Bradley Say, U.S.N.R.

nstitute Proceedings, November, 1945.

Official U. S. Navy Photo

The web-foot attachment gives the underwater warrior extra speed and endurance in the water.

Jap garrison commander would announce that an attempted invasion had been repelled. . . . Demolition Teams right through to Okinawa and Balikpapan boated and swam to Jap beaches without meeting the traps they expected the enemy to lay for them.

This does not mean that they were unopposed. The Jap rained down shell, mortar, machine-gun and rifle fire upon them; but with doughty LCI(G)'s (landing craft loaded with 20 and 40mm guns), APD's, destroyers, cruisers, even battleships, and the air arm pouring shell and bomb upon the Jap, they were able to carry out their missions with low casualties.

The result was that assault force commanders had complete information concerning water depths on beaches of which we had no previous charts; knew where they could send their landing craft; where amtracs could successfully operate; knew that mines and obstacles were gone. All this information was in their hands from one to several days before a landing. Without this information—without this service of these men who went to the enemy's beaches in swimming trunks, tennis shoes, and one-eyed goggles and carrying little sounding lines and charges of explosives around their waists—most certainly the story of our Pacific landings would have been different.

Although there are those who have pointed out that amphibious landings were not new—the science of getting assault forces ashore against heavily defended coast or beaches was basically a new one, conceived and developed after the war was well advanced.

It was in the early part of the summer of 1943 that Cominch's planning people, conscious of the problem that lay ahead, opened the United States Navy's school for training Underwater Demolition people at Fort Pierce, Florida. Germany could be reached only by armies landing on the shores of Europe. Japan's power could be broken only by seizing the bastions she had created in the islands, minute and great, in the far reaches of the Pacific.

Commander Draper L. Kauffman, U. S. Naval Reserve, who was selected to head the school because of his experience in mine and bomb disposal, and his assistants, proceeded to guess at what the enemy would erect in the way of obstacles; then turned to devising methods of destroying them.

Thousands of Americans who served in England or passed through her ports en route to meet the German saw the improvised defenses thrown up after Dunkirk when she expected the Germans to pour across the channel. These included railroad rails driven into the sands with their outward ends sharpened, "scullies", two-ton blocks of concrete with sharpened steel rails protruding from them; miles of steel tubing or piping fashioned into scaffolding. These devices, interwoven with barbed wire, had been placed in the surf along the likely landing places on the coast.

The officers and enlisted men—all volunteers—who entered training at Fort Pierce duplicated these British defenses and conjured from their imaginations innumerable other obstacles. Then they devised ways to blow them out of the waters, theoretically covered by enemy fire. Seabees were used to build and invent obstacles. Seabee volunteers also constituted the backbone of many of the first units trained as demolition teams, and many were still at the job when the war ended. The first teams were small, units of one officer and 5 enlisted men, which grew with experience until the teams operating in the final stages of the war were composed of 13 officers and 87 enlisted men.

The training the officers and men went through at Fort Pierce, and later in the war at advanced Pacific bases, was rigorous and tough. They had to be able to swim long distances, to dive and work beneath the water; to stand exposure and remain calm under punishing gunfire. They had to learn accuracy and to memorize what they had observed. To most of them high explosives constituted a new field. They had to learn its vagaries. Life preservers of the cartridge inflation type were issued to the swimmers, who in their work in the Pacific would operate in pairs so that one

might help the other were either wounded. Actually, many of them worked without preservers. In Pacific operations, they were equipped with finlike attachments for their feet which gave them greater speed and endurance in the water once they had broken in the muscles on which new strain came.

Complete surprise was so important for that morning of June 6, 1944, in Normandy that there was no opportunity for the Combat Demolition Units to reconnoiter or blast out obstacles in advance of the landings. The Navy and Army combat demolition men poured ashore with the infantry three minutes after H-hour. They landed from LCM's, two units from each. The Navy teams were composed of 8 Navy ratings and 5 Army enlisted engineers headed by an ensign or lieutenant junior grade. The Army teams consisted of 25 enlisted men led by a first or second lieutenant.

The Navy units were scheduled to clear the obstacles farthest from shore; the Army groups, those on the inshore side. The teams were to work together clearing gaps for the landing craft approaches and the paths shoreward which the debarking infantrymen would follow.

Initial landings were scheduled at extreme low tide when virtually all of the obstacles built by the Germans were exposed. It would be necessary to blow these out, even while the first wave was still pushing shoreward through them, so that subsequent waves would be unhampered.

Only those who landed that first morning can really appreciate the hurricane of fire on the beaches, particularly on Omaha, from the guns and rifles on the bluffs. Some units had their gaps—120 yards wide on the seaward end and 50 yards on the shore side—cleared in half an hour. Others were not cleared until three days later. Some teams were wiped out to a man by death or wounds. When the job was done on Omaha, casualties ran around 52 per cent.

On Utah beach where obstacles were fewer and where fire from the shore was lighter, casualties were low, and the whole job was done in a matter of 40 minutes.

Months later, when Vice Admiral Henry K. Hewitt's 8th Fleet moved in to land the Army on the south coast of France, the Underwater Demolition Teams escaped virtually without a scratch. But in this later landing, ships' guns poured fire down on the German positions while the Army and Navy teams blasted out the barricades, the mines and booby traps laid by the Germans.

A week after the landings on Normandy, while the Allied armies were still fighting desperately to widen their foothold on the continent, two of the Navy's enlarged and intensely trained Underwater Demolition Teams in broad daylight swam in to chart the reefs and lagoon depths off Saipan and to remove any obstacles the Jap might have placed there to stop invading forces. In the Marshall Island operations earlier in the year, Underwater Demolition Teams had carried out some quick reconnaissance work; but here at Saipan for the first time in the Pacific war heavy fire support had been detailed to protect the swimmers on a complete and comprehensive survey of the Jap's beaches. About 200 officers and men composed the teams assigned. A mile-long swim faced the team members from the time their boats reached the barrier reef. With two battleships and cruisers slapping shells down on the Jap's shore positions, the men swam in, measuring the water depth every 25 yards. At the close of D-minus one they were able to give accurate data on the depth of water over the area to be used; also the information that it was free from man-made obstacles. Their charts showed precisely the only paths tanks could take to reach dry land, vital information for the Marines who piled ashore next day.

After the first units had successfully landed, the Underwater Demolition Teams then blew a wide channel 6 feet deep through the reef around Saipan so that larger landing craft with guns, men, and tanks could pour ashore in volume to support the initial landing forces.

The leader of one of these teams was Commander Kauffman, organizer of the school at Fort Pierce, who had asked to be permitted to head a team in actual work. Later he was to become chief staff officer to the Commander of Underwater Demolition Teams, Pacific.

At Tinian the Underwater Demolition men along with the Marine Reconnaissance Battalion on D-minus 13 and 12 surveyed the narrow beaches which Lt. General Holland M. Smith intended to use. They did the job in black darkness without detection by the Japs. They found the surf and beach free of obstacles, and located the inland mine fields. The Marines landed on July 24 with few casualties because the Jap had not deemed it possible that anyone would dare use such narrow beaches. He expected the landings off the town of Tinian itself where the beaches were broad—and well covered by Jap gun positions.

The amphibious planners and operators were quick to apply lessons learned in the rapid tempo of the Pacific war. When the time arrived for hitting Guam, the Underwater Demolition Team work was down to a science. New methods were devised for delivering more sharply cut fire support—blistering fire coming down close ahead of the men who swam and waded ashore to discourage Jap machine gunners and riflemen from interfering with their work. Added fire from larger guns was poured on inland gun positions. For further measure, airplanes were detailed to strafe and bomb close along the shore and on island gun positions. LCI(G)'s were sent close in to the beaches to whip the sands for any targets of opportunity and to clean the trees of leaves and snipers.

In fact, the pattern as supplied at Guam was basically that used on through to the end, a continuous roll of fire rising to hurricane proportions in periods critical to the work of the Underwater Demolition men.

Official U. S. Navy Photo

An underwater demolition team swimming in to do their work. Swimmers are to the left, their buoyed explosives charges to the right.

Each time the Underwater Demolition Teams went in for a new job, they expected the Jap to have traps set for them specifically, and each time they found him waiting only with guns, mortars, and rifles. More than 3,000 obstacles they blasted from Okinawa's waters. Before the assaulting troops poured ashore on Balikpapan, a solid line of log cribs had to come out of the water.

Long before these last landings, the demolition crowd had picked up many techniques to improve their work. Recovering swimmers from the water was a highly important problem from the first. Each unnecessary second a man was left in the water as an exposed target counted against his safety. It was vital, once he had his job of the moment done, that he be got to the protection of steel-sided landing craft. Likewise, it was vital when a group of swimmers had laid their charges—designed to go up 5 minutes after the safety fuze was ignited—that they be picked up and quickly carried to safety range. This problem was solved by making rubber boats fast alongside high speed landing craft. Sighting a swimmer signaling for pick-up, the landing craft coxswain would head for him top speed. A man, selected for his strength and dexterity, would plant himself astride the outboard gunwale of the rubber boat, grab the swimmer, and plop him aboard.

A reversed technique was used in putting swimmers and their packages of tetrytol overside. The swimmer went off from one side of the rubber boat while the waterproofed explosives kept afloat by a small bladder were tossed off alongside him. He would then swim or wade to the obstacles, pushing the explosives ahead.

At low tide, many of the reefs on which the Jap had built his obstacles were entirely bare, making a swimmer a cold target for snipers or distant gunners. In such cases if sufficient fire could not be delivered to keep the enemy down, the swimmers worked when the tide was partially in to give them coverage. Underwater Demolition men found that it was hard for an enemy to hit them when he had only their heads at which to aim. Also, they found it comparatively easy to escape Jap rifle bullets when swimming simply by diving and keeping under water as much as possible. Many Underwater Demolition men have come through the war, bringing home as souvenirs bullets that were fired at them and which they caught spent under water.

The tetrytol charges were placed in groups, then tied together with primacord, itself an instantaneous explosive. When the last charge was placed, the swimmers would hastily withdraw for pick-up. The Underwater Demolition men were equipped with waterproof watches which were synchronized. At prearranged or signaled moment, the fuze, or fuzes if groups of explosives were used, would be ignited. Coral, concrete, logs, steel, and masses of ocean would fly skyward hundreds of feet.

When the job was done and the swimmers and their support craft withdrew, Tokyo's radio on numerous occasions proclaimed that the Americans had attempted another landing and been repulsed.

Next day the Marines or Army infantrymen would come piling on the Jap's beaches.

The "Royals" (1st Royal Dragoons), part of the British 1st Cavalry Division, fought successfully in Syria against Vichy French forces. Photograph on the right was taken in Palestine in 1939 and shows a troop of the Dragoons.

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Pictures by Ma[illegible]inston

Above photograph shows the 1st Royal Dragoons on the march in Palestine, 1939-40.

Upper Center: A sapper section of the Dragoons during the campaign against the Vichy French in 1940-41.

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Below: A squadron of British Mounted Police in Alexandria, Egypt, 1943. This and sister mounted units kept order amongst desert Arabs. Men and officers were cavalrymen from famous regiments. They were mounted on tough little Sudanese ponies.

Left: The Dragoons after a successful action against Vichy French forces in Syria, 1940-41. Despite inadequate arms they defeated French armored cars disastrously.

Who Beats Phantom?

by Major John North*

The "Phantom" patrols of the British G.H.Q. Liaison Regiment were the "eyes and ears" of the British Army throughout the European War. In every fighting zone they sought information about the enemy. At the request of General Eisenhower shortly after D-day, British Phantom units also functioned for the U. S. Army in the European Theater. The U. S. Army planned to form a phantom force of their own, but the European campaign was won before it could be put into the field.

THE dream of the commanders of past wars has been to know what was happening on the other side of the hill. Today the commander of an army has at his service a tactical air force, specially equipped and trained in visual and photographic reconnaissance. Every aircraft that flies over the battle area is a possible source of information, and if his air force has superior power, the only limiting factor to its usefulness will be the weather.

Nevertheless, however important the air may be as a source of information, it is only one of many from which the general enemy situation is built up. Information will be accumulated by the military intelligence sections; firsthand reports will be available from the commander's own liaison officers in the forward areas. Reliable and timely information is vital to the conduct of operations, and together these various channels should supply it.

Mental Picture of Battle

The commander will need a type of information less easily defined if he is to get the "feel" of the enemy, and is to gain an insight into his mind and intentions from a psychological rather than, for example, a photographic approach. In the British Army this information is supplied by a highly specialized body known as the G.H.Q. Liaison Regiment, which offers a particular contribution to the commander's mental picture of the battle. Its information, which is valuable because it is based on firsthand observation of the enemy in action, is transmitted directly to the commander's own headquarters.

The members of the G.H.Q. Liaison Regiment wear on their shoulders the small letter "P", which stands for "Phantom." In its offensive rôle it is the advance party of the British Army. "Phantom cover" is to be found on every British battlefront, and "Tell us, Phantom!" is the injunction that reaches Phantom patrols through every phase of battle.

What Is Phantom?

The name "Phantom" came from a radio code word —and it well describes the stealthy missions of Phantom patrols through every British battle zone, and sometimes through enemy lines as well. A patrol may consist of no more than a single armored car, manned by an officer and 6 men; but the car will carry highly specialized equipment and each member of the crew will be a radio expert, and much else besides. The patrol will have lateral communication with other patrols, and will be in direct communication with the control station at its own headquarters. From that headquarters will flow a constant stream of information to the commander in chief. His operations map will therefore show within a matter of minutes the latest positions of the farthest-flung front-line troops.

In World War I, Field Marshal Earl Haig had something of the idea of Phantom when he sent junior staff officers to visit the forward positions during a battle and had them report back in person to his headquarters. Employing quite different means, and working more elaborately, Phantom today performs a similar function. The information it gathers often is communicated simultaneously to the local commander and to regimental headquarters. The local commander, in turn, will ask the Phantom patrol in his sector for the latest news of the battle. Phantom has the right of entry to any headquarters. It gets the picture, and is gone.

In Britain's Defense Plan

Phantom did not emerge as a fully developed idea. Its first appearance was in France, in January, 1940, when it operated only for the air force commander. It consisted of troops with armored cars, a platoon of motorcyclists, and intelligence officers, also with motorcycles. Its main mission was to transmit information that would enable the Royal Air Force to play some part in the land battle. When France fell this immature organization became extinct, but between June and October, 1940, it was rebuilt with far wider responsibilities. It was directly employed in the general plan for the defense of Britain.

The founder of Phantom in its new form was Colonel (afterwards Major General) G. F. Hopkinson, who was killed while commanding the 1st British Airborne Division in the invasion of Sicily.

It was he who laid down the lines to be followed in

*British Staff Officer.

the selection of personnel. He was not primarily concerned with a candidate's soldierly or technical qualifications, nor if his only qualifications were linguistic or academic, just so long as he had character and an adventurous spirit. Character was a first requisite. A junior member of the regiment might be called upon to keep his end up with highly senior commanders in the field, and again, in the lonely search for information during the course of a battle, he would be called upon to show a degree of cool initiative which is sometimes to be differentiated from an act of courage performed alongside one's comrades. If a man had the right temperament, the necessary staff and technical training could follow. A member of a Phantom patrol will almost invariably be bilingual, and certainly a radio expert competent to take command of the technical link. Today the G.H.Q. Liaison Regiment is recruited from the entire British Army, but no member is asked to forego his regimental connections.

In the defense of Britain against threatened invasion, the regiment was deployed along the coast, and was in direct radio communication with its headquarters in St. James Park, London, with the War Office, and also with the commander in chief of the Home Forces. Its patrols were attached to local formations rather than to areas, and arrangements were made whereby these local formations were informed as speedily as London of any enemy move within their area. In this defensive rôle Phantom earned the title of "the eyes and ears of the commander in chief." Not until later was it to assume the more adventurous functions conceived by its founder.

Only Facts Purveyed

The appearance of a Phantom patrol is welcomed by every headquarters within a battle zone, quite possibly because Phantom does not trade opinion, but purveys facts alone. Its reports are exclusively factual, and deal only with plans and the results of operations. Its only barter is information, and every message it sends out has two cardinal features—the source of the information, and the time. Phantom also gives an intercept service to all commanders as a matter of routine.

In the British Army organization, a Phantom patrol is allotted to a corps front, and a patrol to each division within the corps. An offensive patrol, which may number 6 officers and 30 or 40 men, offers an even greater opportunity for the adventurous spirit of the regiment. It is then that Phantom becomes the advance party of the British Army.

When an offensive patrol sets out to fight its "radio battle," it is equipped with cars, motorcycles, and 15-cwt trucks. It carries enough radio equipment to establish out-stations deep in the enemy-occupied country (as in Greece and Eastern Thrace), together with a receiver-link to Britain. It was a Phantom offensive patrol that supplied the sole means of communication between the British and Greek Governments and the local Greek authorities until Greece was liberated. In this same fashion Phantom offensive patrols operated in Persia and Iraq.

Normal patrols operated with the British First Army in Tunisia, with the 1st British Airborne Division in the Sicilian operation, the British Eighth Army in the Western Desert and in Italy, and with the British and Canadian Divisions in the landings in France. Patrols were dropped and fought with Special Air Support troops on all their major missions behind the German lines.

Phantom Patrols on D-Day

The value of the G.H.Q. Liaison Regiment was particularly evident during the Normandy landings. Phantom patrols accompanied each of the assaulting British and Canadian divisions and corps headquarters. The first message from the soil of France was received by the Phantom control post in England. It was quickly succeeded by other Phantom messages from the British and Canadian sector. Ultimately its patrols were switched to the Normandy front, and again were first with the news.

During the Falaise battle, Phantom patrols ceaselessly moved back and forth between the jaws of the Gap, and among the British, Canadian, American, and Polish divisions engaged in the pocket. At a time when the German command confessed it had no knowledge of what was happening, Phantom was sending to the Allied Command precise details of troop positions and the locations of German tanks. It was Phantom that gave the Allied Air Forces their bomb lines. Once, a Phantom patrol operated directly between two portions of the same German regiment. Another of its patrols found itself at the actual junction point of the Allied forces, and got through the first message, "The Gap is closed."

At Arnhem, the Phantom patrol consisted of one officer and 4 men in jeeps. A Phantom patrol was first to reach the docks of Antwerp. Phantom was early on the scene in the Ardennes battle. Its patrols accompanied the assault troops across the Rhine, and during the advance through Germany kept the higher command informed of the positions of the leading troops. A Phantom patrol first effected actual contact with the Red Army. One of its officers was the first to get word back about conditions at Belsen concentration camp.

In the minds of those who created and operated it, Phantom is not a piece of mechanism that can be devised by allocating a certain number of men and suitably equipped vehicles to perform a set task. Phantom is an affair of the spirit.

Last Word from Wake

As Told to a Member of The Cavalry Journal Staff

by Major Henry Stanley Wilson*

From December 11, 1941—three days after the Japs first hit Wake Island—until December 23, when it was captured, the only communication with the island was furnished by a small detachment of army radio personnel. Composed of one officer and 5 enlisted men, it stayed at transmitter and receiver, and, through daily bombings, maintained a 24-hour contact with the outside world until its unofficial sign off.

AT 0530, December 8, 1941, Captain Henry Stanley Wilson, in charge of a small army radio station on Wake Island, telephoned from his quarters to the radio-trailer, which was in position at the airfield.

The sergeant radio operator on duty at the trailer said, "Captain, I don't believe what I'm hearing. It's . . ."

"Put the radio earphones against the mouthpiece of the telephone," Wilson instructed.

The message that was being transmitted in Morse code, in the clear, came over the phone to Captain Wilson in the unmistakable, characteristic sending style of Lt. Colonel Clay I. Hoppough, Signal Corps, Hawaiian Air Force Communication Officer:

"SOS. SOS. Japs attacking Oahu. This is the real thing. No mistake."

Captain Wilson instructed the sergeant to obtain all possible details, and then hurried to the quarters of Major James P. S. Devereaux, U. S. Marine Corps, and commandant of the Marine 1st Defense Battalion on Wake. He woke Major Devereaux, and told him the news.

After a quick cup of coffee, Wilson went to his radio station at the airport and put into effect a plan he had made some time before. When he had come to Wake in October, 1941, he felt that war with Japan was probable. If it came, the airfield where his station was located would be one of the first places the enemy would strike, and for this reason he had picked several alternate positions to which the 1,300-pound, portable set could promptly be moved.

Station Moved Immediately

At the field, he rounded up the crew of 5 enlisted men, some of whom had been on duty during the entire night. In a few minutes after word of the Pearl Harbor attack had been received, the station was being moved to its first alternate position, several thousand yards from the airfield.

Four hours and 45 minutes later the station was on the air and had reëstablished contact with Hickam Field. The time was 1149.

Six minutes later, at 1155, more than 50 Japanese aircraft attacked the island. They were two-engine bombers, apparently from the Marshall Islands, and flew in low. First, they strafed and bombed the airfield. Eight fighter planes were destroyed on the ground, as well as the Marine Corps' radio installations and a large gasoline storage tank. Bombs fell within 100 feet of where Wilson's station originally had been located.

The planes then flew over the Pan-American installations on a small island which is a part of Wake, bombed and strafed the hotel and radio station, and destroyed both.

During the 15-minute attack, two of the 6 in the radio crew were wounded. Captain Wilson was hit above the right knee by a bomb fragment, which he extracted himself, and Sergeant J. B. Rex was wounded in the back by a bomb fragment while on duty in the radio-trailer. Neither was incapacitated. The only damage sustained by the newly moved radio station was machine-gun bullet holes through the trailer, which housed the receiving unit.

When the Jap planes left, Wilson went to the Pan-American installation to salvage what parts might be of use. He found little that would be of value to help maintain his equipment through the bombings that were to follow daily until the island fell.

During the afternoon of the first day, the station maintained a regular schedule of contact with Hickam Field. That night, fearing that the low-flying Jap planes had spotted the radio-trailer, the crew of 6 again moved the station to a position well removed from the general area of the airfield.

*Signal Corps, attached to Hqs. Hawaiian Air Force.

The next day at 1100, the Jap planes returned in force and bombed and strafed the entire island, but this time they flew higher because of antiaircraft fire. A bomb landed within 200 feet of the radio station's new position, but fortunately caused no damage. Believing that the new position had been located, Wilson and the crew again moved the station during the night—an operation that was to be repeated 4 more times, always at night under blackout conditions, before the island was captured after its gallant 16-day stand.

Navy's Radio Destroyed

On December 11, three days after the first attack, the Naval Radio Station on Wake Island received a direct bomb hit and was totally destroyed, thus leaving the small Army Air Force Communications Detachment, which was a part of Headquarters, Hawaiian Air Force (later the 7th Air Force), the only means of communication from Wake to the outside world.

It now was both apparent and reasonable to Wilson that the Japanese would begin concentrating on locating and knocking out his equipment. For three days prior to the attack, Japanese radios from naval vessels in the vicinity had been very busy "jamming" the air whenever messages were being transmitted to Wilson from Hawaii. When he transmitted, however, the jamming stopped and the Japs listened in. On one of these occasions when Wilson gave the call letters the Japs answered and said: "Go ahead." He then asked for the recognition signal, after which the Japs sent nothing more. (The signal was changed at regular intervals, and the Japs did not have it.)

Station Sandbagged With GI Coffee

After thinking over the situation, Wilson decided to sacrifice the mobility of the portable radio set for its security, and the equipment was dismantled from its truck and trailer, and installed in an incompleted concrete ammunition magazine. This was covered with 8 feet of earth by a bulldozer, and camouflaged with brush. It was impossible to dig in more than 4 feet because water was struck at that level. The entrance to the dugout was sandbagged with sacks of GI coffee. This position was used until the island fell.

Navy Uses Army Radio

On December 12, the day following the destruction of the navy's radio, the facilities of the Army Air Force Unit's radio were made available to the naval commander. A receiver was placed at the navy's disposal, and a keying line was provided from the transmitter. The unit maintained continuous, instantaneous communication for 24 hours a day with Hickam Field, and furnished the navy with the same facilities for contacting Pearl Harbor.

The Japs on December 12 made an all-out attempt to take Wake, Captain Wilson related, but the marines made the operation too costly. The enemy had believed, however, that the attack would not fail, and therefore had broadcast to the world the news that Wake Island was in Jap hands on the 12th.

This Jap report of Wake's fall on the 12th, of course, was received at Wilson's headquarters in Hawaii, which then devised a clever means of determining the truth of the Jap report.

Wilson told the story as follows:

"Colonel Hoppough, who was receiving my messages from Wake on the 12th, thought he detected a difference in my style of sending. Operators have a characteristic 'touch' on the key, which can be recognized, and Colonel Hoppough, having talked by radio many times with me, knew my style. The logical conclusion was that if the Japs *had* landed, and I was sending, I was doing so while a Jap pressed a pistol against my head.

"Colonel Hoppough and I are fortunate in having had as a close friend for many years Major General George Van Deusen, known to us affectionately as George Van. On the 13th, Colonel Hoppough, on the key at Hickam Field sent to me, on the key at Wake, the following message: 'George V wants to know if you are still having heart trouble.' "

"He knew that only I would know who was meant by George V. 'Heart trouble' to me indicated 'Fear.' I concluded that the colonel wanted to know if the Japs were forcing me to transmit.

"I previously had sent the information that we had dug in the radio station. And so, when I answered his message by sending: 'Would like to have you and George V join us for tea in our underground boudoir' it indicated the authenticity of the messages, and that Wake Island had not fallen as the Japs claimed.

"The next day he sent a message stating: 'Congratulations, Hawaiian Air Force had believed you were a temporary guest of the Mikado.' I said to myself 'Not yet.' "

During the 16 days before the island fell, the army crew of 6 kept their radio on 24-hour service by using a shift of three men, one maintaining equipment, one operating, and one standing by.

The Japs attacked at least once, and sometimes twice a day, with never less than 35 planes, and usually 50.

No request was ever made from the station for help —only reports on conditions were sent. These included messages concerning the tactical condition, weather information, a few casualty lists, type and number of raiding aircraft, direction from which they attacked, and damage.

By December 23, having "lost face" in the 12th's attempt, the Japanese were ready for an overwhelming effort against Wake Island. Wilson said that it appeared as if the entire Jap navy was attacking, and that the island was surrounded with a ring of steel. The air was black with planes.

In order to get troops ashore, the Japs rammed two perfectly good destroyers onto a reef, wrecking them

but enabling troops to clamber over the decks and jump down into shallow water about 100 yards from the beach. Wilson said that he saw a marine officer on Wake bore sighting a 3-inch piece at point-blank range at the two destroyers. He was hitting them some damaging blows with his unorthodox shooting until the Japs landed and captured the gun.

The last official act of the valiant crew of 6 army radiomen as soldiers of the United States until their liberation as POWs was to destroy all codes, by burning; all cipher devices, by dismantling and throwing into the ocean; and the radio transmitter, by burning out the power transformer and smashing all meters.

Personal Contact With the Japs

Captain Wilson's first personal contact with the enemy occurred when he was interrogated. First, he was asked why he had destroyed the radio transmitter.

"Very obvious," he answered. "So you could not get it."

Next he was handed a coded message and asked to translate it. He replied he was unable to because he did not have the code book.

"Where is it?" the Japs asked.

"I burned it."

"*Burned* it?" the Japs repeated, as though amazed.

They then wanted to see the ashes, and Wilson led the way to them.

The questioning continued, concerning various phases of communications, but the Japs continually returned to the burned code.

Wilson finally told them—emphasizing the word "modern"—that it was the custom in all modern armies when capture was imminent to destroy anything which might be of value to the enemy. "Of course," he added, "I don't know whether you do that in the Japanese army, or not!"

"Oh yes, oh yes, in Japanese army, too," he was hastily informed, which ended the questioning about the code.

-Wake Capture Costly

Wilson told of conversations he had with Japanese naval officers on Wake, who said that the Americans fought very well. He asked, "Well, what the hell did you expect?" The Japanese commandant who captured the island repeated: "Fight very well."

Wilson then asked him how much it cost the Japs to capture Wake, and he replied: "Too much." Wilson insisted: "How much?"

"Twenty-nine airplanes, 9 warships, 5,000 Japanese sailors."

The captain was on Wake when the U. S. naval task force shelled and dive-bombed the island on February 23 and 24. The Japs at the time were using a captured marine 5-inch coast defense gun. During the heat of the attack, the gun stuck in recoil position, and the Japs could not get it back to battery position.

They came and got Wilson, and took him through a heavy American attack to the gun and told him: "You will fix."

He explained that he had never seen one of the guns before—he was a signal corps officer. The Japs then handed him a book marked "Confidential," and which contained a detailed description of the gun's assembly, disassembly and maintenance.

"You must study hard," the Japs said.

The attack had not lessened; Wilson did not like it.

He was thumbing through the book trying to look studious, when he came upon a picture of the breech section in which an arrow pointed and a caption said: "Do not remove this plug. If you do the hydraulic fluid will be lost from the cylinder."

Quickly turning to another part of the book to conceal the picture, Wilson began experimentally fumbling around on the gun, and then started unscrewing the plug. It shot out in his hand, and out came the fluid.

The Japs took one look at him, and then led him by the arm back to the camp. When he left the island three months later, the gun still was in recoil position.

During his 5 months on the island before he was sent to prison camps in Japan, Wilson watched the Japs use American civilian contractor personnel and blueprints in a continuation of the projects that were under way prior to the capture of the island. Such work was carried out to the completion of an entire new runway for the airfield. The Japs, however, were unsuccessful in dredging out the turning basin for the submarine base.

The 5 enlisted men who served through the entire period of the siege of Wake Island, Captain Wilson said, were outstanding in their devotion to duty amid trying conditions of poor food, little or no sleep, and under daily air attack. No single complaint was ever made by them either to him or in his presence.

The records roster of the group shows that two, previously mentioned, were wounded. The 5 enlisted men have been recommended for the Silver Star, and Wilson for the Legion of Merit awards.

The 5 enlisted men were Staff Sergeant E. G. Rogers, Air Corps; Staff Sergeant C. H. Hotchkiss, A.C.; Sergeant C. W. Dilkes, A.C.; Sergeant J. B. Rex, Signal Corps; and Pfc. P. F. Fultrup, A.C.

During his captivity Wilson suffered bacillary dysentery, beri-beri, edema, and chronic diarrhea, and weighed 97 pounds when liberated by the U. S. Eighth Army on September 7, 1945, following which he was returned to the States.

Last Word From Wake

It was Wilson's station which sent the famed message during the time of siege: "Send us more Japs." This was sent when a naval officer used the words to "pad out" a line in an official message.

Wilson himself was at the key to send the last word that went out from Wake which was—also unofficial—"The Japs have landed, and the issue is still in doubt."

Four Armies Trained by Great Britain

*by Major Ernest Watkins**

It is sometimes suggested that Britain entered the war unprepared. It is quite true that Britain was unprepared for the war that actually happened, but that is true of every nation that took part in it, Germany included. In fact, one of the causes of Germany's final defeat was that when she created and built up her Luftwaffe she failed to provide the right kind of offensive or defensive force for operations in the air.

AN army depends on men and equipment. The disadvantage under which the military chiefs of the Western Allies labored before the war was that they were required to prepare for a war under peacetime economic regime, whereas their opponents had already created wartime economies. In 1938 and 1939 the General Staffs of France and Britain had planned that the British contribution to their joint land forces should be some half dozen infantry divisions, available at the outset of the war and to be under the command of and subordinate to the French Army. That was provided. Four British Divisions landed at Cherbourg in September 1939 and a fifth was formed in Flanders in October of the same year. They were fully mechanized and equipped and perhaps the worst criticism that can be made is that their infantry was deficient (again in common with their Allies) in effective antitank defenses. They were already equipped with the 25-pounder field gun, which remained, unmodified, in full and effective use during the remainder of the war, and the 5.5-inch medium gun, also unsurpassed throughout the whole war, had already been designed, although it was not then in full production.

Until 1939 the British plan for defense rested on two armies, one a small professional army, always trained and equipped, the other a volunteer Territorial Army of part-time soldiers, as a second line. In 1938 that Territorial Army had been doubled in size and had been given responsibility for the manning of the coast and antiaircraft artillery within Britain itself, two tasks for which it was fully prepared by September, 1939. In March, 1939, there came the major break in British tradition. Britain introduced compulsory military service as a peacetime measure and by May, the first "militia" were in training, and some of those men were in action in France later that year. In addition 7 Territorial Divisions landed in France before May 1940, some not fully equipped and sent for training and pioneer duties, but others complete. All of them fought in the battles before Dunkirk.

That phase of the war came disastrously to an end at Dunkirk. The equipment of the whole force was lost and only by a miracle were some 300,000 men brought back to Britain. The British Army faced an entirely new task. They had to prepare for war all over again, this time with the enemy at their gates, encircling their base with his submarines and bombing the war factories with his still unbeatable air force.

It is at this point that the earlier British plans for supply became important. The expansion of British industry for war had started as far back as 1936, with the creation of what were known as shadow factories These were largely duplicates of existing industrial factories, sited away from the main centers of production and in any case dispersed so that no bombing of an area would cripple any one industry. Each factory needed only two essentials, that it should have access to a railway and that it should not be too far away from an existing center of production, so that a labor force could be brought in each day without the necessity for extensive rehousing. By 1940 most of the factories were under construction. A great many were already in production. By the spring of 1941 the existing British Army had already been largely re-equipped.

But now it had to prepare for another kind of war, or, rather, for two kinds of war. The British Army was committed to the defense of the eastern end of the Mediterranean, and, ultimately, to the recapture of the whole of the Mediterranean area. It was also conscious that some day it would have to undertake a landing on the coasts of German-occupied Europe. Where that landing would be, and when it would be made were matters which could not then be determined, but the fact that in the winter of 1940 mass production of engines for landing craft was started is evidence that the determination to return to Europe to defeat Germany was already a fixed element in British strategy. There was no other way in which the war could be

*British Army Bureau of Current Affairs.

won, even were it to last 20 years. The German attack on Russia and the United States changed the details of the plans, and made their fulfillment so much more possible, but it did not change the pre-existing resolve.

But after December 1941 the British Army was freer to plan and train for specific operations. The first difficulty was to give adequate training for battle troops who had not been in battle and yet who would have to face in their first engagement veterans of many wars. It was impossible to send every division for a tour of duty in the Middle East. Shipping did not permit of it. So the Battle Schools came into existence.

The basic idea of the Battle School was to introduce into the training of the soldier some of the actualities of war, the physical conditions of combat, the sounds of battle and some of the risk. Live ammunition was used. The men went into the training exercise behind their own artillery barrage and there was an enemy, in German uniform, firing over or to one side of them so that men were literally under fire. Mines were exploded in their faces, and there were air attacks.

As time went on the idea was expanded. By 1944, men, British and American, were training for assault landings under conditions almost identical with those they were likely to meet on the section of the European coast chosen for the 1944 assault. Every enemy defense strong point and device had been duplicated. Hundreds of acres of British farmland and pasture had been turned over to exclusive military use and had been ravaged by explosions. Every assault division went through this training.

Side by side with this general training were the Commando operations from 1941 onward. The raids across the Channel, from the small assault on Bruneval to the large scale attacks at St. Nazaire and Dieppe, were not only important in themselves. They were experiments of the greatest value to the later main assault and they were also object lessons that helped to build up the confidence of the whole of the Army. What could be done by men in the Commandos could be done by any soldier, so the soldier came to believe, and he was right.

It is interesting to look back and contrast the equipment available in 1940 with that used in 1944, for nothing shows more clearly the change in tactics and training that had taken place over that period. And with each piece of equipment one must bear in mind the story of its development, first the tactical need for it, then the designing of the thing itself, and the problems of mass production and finally the training of the men in its use, all in a period in most cases far shorter than 4 years.

The infantry needed antitank guns. The 6-pounder and the 17-pounder guns were designed and the infantryman had to become a gunner as well. A short-range antitank weapon was needed, and the PIAT was devised and supplied. The German mine became a difficult obstacle, so an electric mine detector came into being. Portable flame throwers were produced, for town fighting and the reduction of concrete strong points. Never had the infantryman had so much to learn.

So with mechanized forces, tanks themselves were improved, and became specialized. There were flame-throwing tanks, mine-clearing tanks, tank for engineers, fitted with heavy mortars, and finally amphibious tanks, first used in the sea-borne landing at Walcheren in November 1944 and playing a great part in the Rhine crossing in March.

Artillerymen had finally given up their horses before the war. Now they had to become drivers of armored tracked vehicles as well as of wheeled, for the self-propelled gun became a necessity in battle. Not only that, the gunners became airmen as well. Air observation aircraft were piloted by army officers who flew the machines and, by means of radiotelephony, gave the fire orders to their batteries on the ground as they did so.

Perhaps the most vital service, and one too easily overlooked, is that which maintained this complicated equipment in action. Mechanical, electrical, optical, every kind of machine used in the Army is repaired and maintained within the Army, and the men of the Services responsible for that work had to train as soldiers and as craftsmen. The whole technical teaching resources of Britain were thrown into the effort to supply the Army (as well as the Navy and the Air Force) with the technicians it needed.

No account such as this would be complete without some reference to the women who became part of the Army, the Auxiliary Territorial Service. Each replaced a man. At first the jobs they were given were jobs not directly concerned with operations, such as clerks, cooks and storekeepers. But from the very beginning they were driving vehicles under every kind of condition. Then, as an experiment, they were introduced into the fighting sections of antiaircraft batteries, and took over the instruments as opposed to the guns. Mixed regiments were formed, in which women were the majority, and the results they achieved in the flying bomb attacks on Britain were remarkable. At the end of the campaign mixed batteries of men and women were shooting down at night 85 per cent of all possible targets.

Britain in this war, in addition to the vast Navy and Air Force, has trained and equipped four armies: the Army that fought in France in 1940, the Army that drove the Germans from North Africa in 1942 and 1943, the Army that landed in Normandy in 1944, and the Army that destroyed the Japanese in Burma in 1945. Each Army needed different equipment and different training, and each Army, sometimes alone, sometimes as part of a larger Allied force has been victorious. The British have shown once again that while they are not a military nation they are a warlike people.

PRO Pays Off in Battle

*by Major Harold D. Steward**

PUBLIC relations pays off in battle. Combat officers, from a platoon leader up, will verify this. They will agree that soldiers are proud of receiving public credit for their exploits in battle, and that a story in a soldier's home-town newspaper is a great boost to his morale.

Men also like to hear about their unit on national radio networks, read about their outfit in the national magazines, and know that their unit's name is, in general, before the American public.

To accomplish this is the job of the army's public relations officers. To show how it is accomplished, this article outlines how the 1st Cavalry Division's public relations setup was operated through both the Southern Philippines and Luzon campaigns.

In early October, 1944, about 10 days before the 1st Cavalry Division embarked from the Admiralty Islands for the Philippines invasion, 15 war correspondents arrived at division headquarters. The PRO and his staff, which at the time consisted of three enlisted men, were charged with receiving and taking care of them.

Orientation of War Correspondents

Arrangements were made immediately for the war correspondents to be briefed on the upcoming Leyte invasion. The briefing, although secret and "off the record," gave the correspondents a better understanding of the war story they were soon to cover. The newsmen then were furnished with a history of the division and biographical sketches of the division's general officers and regimental commanders. These the correspondents filed with their offices in advance.

In the days preceding the embarkation for Leyte, the correspondents were taken on an extensive tour throughout the division area and introduced to the various commanding officers and to the men. This later proved a great help in coverage.

During this time, and later aboard the transports en route to Leyte, the public relations staff had been writing advance stories on the soldiers who were to make the Leyte landing. These stories would be available for use after the landing, when it could be publicized that the 1st Cavalry Division was committed in the action. They included such information as what the soldier's job was with the division, what his personal feelings were about returning to the Philippines, and his complete home-town address.

For transportation, the public relations office had been allotted a jeep and a three-quarter ton weapons carrier, which were combat-loaded on the ships since they would be needed the moment the landing was effected.

Signal Corps Photo

A combat movie cameraman photographs a light tank of the 754th Tank Battalion firing at Japanese positions.

PROs Land With Assault Troops

On D Day, October 20, 1944, the public relations staff and war correspondents landed with one of the first three waves. (It is imperative that public relations personnel go ashore with assault troops, for news events are in the making and PROs can be of assistance to war correspondents.)

Each PRO member landed with a different unit, and immediately began gathering the routine "first" stories —who was the first soldier ashore, the first officer, who killed the first Jap, etc.? These stories were furnished the war correspondents in hand-outs. That night the PRO staff and the war correspondents slept in a hut on the beach.

On D Day plus One the 1st Cavalry Division's public relations office was set up in an old building on the road to Tacloban. Tables and chairs were provided for the correspondents, and rations were brought up in the weapons carrier.

On the night of D plus One, Major General Verne D. Mudge, division commander, held his first press conference. The conferences were continued almost daily thereafter, and did much to keep the Division in the news each day, and also won the favor of the correspondents.

The speed with which news moves determines much of its value; therefore one of a PRO's first considerations must be the establishment of a quick method for sending out the stories of war correspondents. In the Leyte campaign, the stories were delivered by a jeep messenger to a central station on the beach, and from there delivered by an LCM to a radio ship offshore from which they were flashed to the home offices of the correspondents.

On D plus Two, the public relations office was estab-

*Former 1st Cavalry Division Officer.

lished in the Leyte Normal School building in Tacloban. Some of the correspondents were quartered there, and others stayed in civilians' homes. All ate with the 1st Cavalry Division headquarters company.

A daily news hand-out on the military situation was written by the PRO, and distributed among correspondents. The best feature stories written by PR personnel were turned over to the correspondents, since copy filed by them always gets a better play in the states.

After leaving Tacloban, the PRO staff and correspondents lived in a tent, from which a messenger service for correspondents' stories was operated daily.

To operate effectively, a PRO must establish a working system; however, he must still plan moves ahead of time. When a big story is about to break, he must inform correspondents in advance, and arrange for the facilities they will need to cover it. And, to repeat, he must see that the stories are transmitted.

To illustrate, the commanding general of the Division received word on January 29, 1945, that the Division would move on Manila. This gave little time for arrangements, which were carried through as follows:

Coverage of the "Flying Column"

First, the war correspondents, who were at GHQ 60 miles away, were notified barely two days ahead of time that the Division would begin its race for Manila at midnight, January 31. Fourteen correspondents signified their desire to accompany the now famous "Flying Column."

The radio transmitter that would be used to send the stories out was located at the GHQ public relations office. It was necessary, therefore, to arrange for them to send a courier to the division's rear echelon, where he would pick up the stories that were sent back from the advanced echelon. En route, the division PRO operated in two separate sections. One of its jeep messengers, at one time, was traveling 75 miles to the rear echelon, and another the 60 miles from the rear echelon to the GHQ radio transmitter station.

On the way to Manila, Major General Mudge held a press conference each night to keep correspondents informed on the military situation.

When the city was reached a field artillery liaison plane was used to transport the radio correspondents, as well as the written stories of correspondents, to the transmitter at GHQ. The result was that news coverage on the 1st Cavalry Division beat that on other units by more than 24 hours.

The liberation of prisoners at the Santo Tomas University internment camp drew practically all of the war correspondents in the theater, and to these the division PRO was a host, whose duties included rationing and quartering them on the spot.

During this time the division public relations personnel, which had been increased to 5 enlisted men, were kept busy writing feature stories on the division and the men in it. Again the best feature stories were given the correspondents, and were invariably used.

News releases on every officer and man that entered Manila with the "Flying Column" were sent immediately to home-town newspapers, and because they were timely, got a pretty fair play. To get them out fast, troop clerks were pressed into service.

In addition to caring for war correspondents and preparing hand-out releases, the public relations section continually wrote stories about decorations and promotions. The stories behind the awards of the higher decorations were turned into general releases for the correspondents.

General PRO Problems

When publicizing any military unit, whether company or army, a public relations officer must slant his material for a possible use in all publishing media, and not concentrate his efforts on newspaper publicity alone. The other media are magazines, motion pictures, still photographs, radio networks and individual stations, and books. Magazines are on the lookout for feature stories about units which are built around one or two of its outstanding individuals; radio networks will use spot news, spot news features, and interviews with men who have done the unusual; motion picture and still cameramen always welcome any idea that will lead to good news or feature pictures; many war correspondents are writing books and will welcome material to include in them.

PROs should avoid "polishing the brass"; that is, spending a great deal of time writing about the high ranking officers in the unit. No story should be written unless it will stand up to a news or feature test. Only about 10 per cent of a unit is officers, and therefore 90 per cent of the releases should be about enlisted men.

In the 1st Cavalry Division the Public Relations Officer worked directly under the Chief of Staff as did other staff sections. This plan worked well, and apparently is the best. It puts the PRO on a par with the other staff officers, which is a decided advantage. A PRO should also have a separate office rather than working in one with some other section.

The biggest public relations problem is obtaining personnel. PR operates without a T/O, and personnel is obtained from other units on a temporary or attached basis. Once the value of a public relations setup is proven to the commanding officer, however, the needed personnel will be forthcoming. This is especially true while a unit is in combat.

There is no set of rules to follow in handling publicity for a unit, and a PRO must make his policies as the various problems present themselves. For this reason a policy book should be formulated for the section as work progresses; from time to time it will be of great assistance.

The reward to the Public Relations Officer for his work is the self-satisfaction that comes from seeing that his unit gets public credit for what it does in battle.

JOB TRAINING

*by 1st Lieutenant Walter J. Schweitzer**

THREE HUNDRED students are enrolled in on-the-job training courses at Fort Riley, Kansas. The newly inaugurated program is designed for the reëducation of men who have been away from their work for any extended period of time. A secondary purpose is to provide a sound foundation for further technical school training should an individual desire to take advantage of the education provisions of the GI Bill of Rights.

A board of officers has been organized for the purpose of coördinating the effort among the various departments of The Cavalry School, which has been called upon for instructors, material and its many other facilities that are available for instructional purposes. The board is headed by Lieutenant Colonel James F. Hollingsworth, of Fort Worth, Texas, who is assisted by Captain Jewett A. Dix, of Fort Lauderdale, Florida; Captain Lester B. Johnson, of Kansas City, Missouri; and Captain Albert W. Ackroyd, of Cuyahoga Falls, Ohio.

The new program offers 13 practical courses in:

*Public Relations Officer, The Cavalry School.

Major General I. D. White, second from left, commandant of The Cavalry School, discusses the merits of the drafting course with students. On right, a warrant officer-instructor is helping student work out a problem in projection.

An education program to train soldiers for rôles in civilian life has been established at The Cavalry School and School Troops at Fort Riley, Kansas. Students attend voluntarily, and 13 courses are available, ranging from the intricate subject of radio maintenance to one for the equestrian.

Students check the circuit on a modern radio transmitter to locate shorts or breaks preparatory to making repairs.

radio maintenance, auto mechanics, horsemanship, carpentry, painting, photography, drafting, printing, electrical work, plumbing, refrigeration, welding, and machine-tool operation.

Particular care has been taken to formulate a well-rounded course in refrigeration. Because of the coming emphasis in the postwar home on deep freezing, air conditioning and modern refrigeration, wide opportunities will be offered men trained in this field. The same can be said for the radio course, which embodies many related subjects, including radio operation, maintenance, electronics, television and frequency modulation. Regardless of the course chosen for study, the individual has available professional training and facilities seldom offered anywhere but in the army.

A study hall has been provided for students who desire to apply themselves beyond course requirements. It is shared by others who are enrolled in the multiple academic courses offered by the U. S. Armed Forces Institute. The courses taken by these students will enable them to receive a high school diploma, or better prepare them either for entrance into college or for work toward a college degree.

Many of the Fort Riley students are learning a new trade. The army is thus offering them a chance that to a civilian would be a gamble. As Corporal L. L. Stevans, of Marblehead, Mass., puts it: "The training offers a big advantage, for should anyone fail in any of the courses offered, he may change to another. As a civilian he could never afford to take that gamble."

Both electric and acetylene welding instruction is offered in the new educational program at The Cavalry School. An instructor watches as a student brazes a handwheel.

As an example of how the courses are fitted to future jobs, students in the auto mechanics course work with various types of civilian vehicles rather than with army vehicles. In the printing course, a student sets up the type, makes the necessary adjustments on the press, and carries a press job through to completion.

Many prospective students are consulting 1st Lieutenant Richard C. Reidenbach, of Rochester, New York, Information & Education Officer and in over-all charge of the program, for advice on the courses offered.

A civilian instructor points out the function of the parts in a combustion engine to two students of auto mechanics.

ARMORED DIVISIONS IN WORLD WAR II

1st—"Old Ironsides"

The 1st Armored Division tasted heartbreaking setbacks in North Africa but fought on to a smashing victory. Later it went to Italy where it fought before Cassino, landed on the Anzio beachhead, and led the push to Rome. It kept on going over the Apennines to Bologna and Milan and across the Swiss border. It has been selected for occupation duty in Germany.

2nd—"Hell on Wheels"

With a total of 1,091 officers and 2,146 enlisted men with decorations, the 2nd Armored Division is proud of its combat service in the invasion of North Africa at Casablanca, the battle for Tunisia, the invasion of Sicily at Gela and the invasion of Normandy. It fought across France, Belgium, Holland and finally into Germany and occupied a section of Berlin after VE-Day.

3rd—"Spearhead"

"Firsts" claimed by the 3rd Armored Division are: first to cross the German border, September 12, 1944; first to take a German town, Roetgen; first to break the Siegfried Line (by Task Force "X"); and first to invade the "sacred" soil of Germany since Napoleon. The 3rd fought from St. Lô to Mayenne and Chartres, past Château Thierry to Mons, then to Liége and Aachen. Major General Maurice Rose, commander, was killed in action.

4th—"Breakthrough"

For relieving the trapped 101st Airborne Infantry Division at Bastogne, the 4th Armored Division and attached outfits received the Distinguished Unit Citation. In more than seven months of fighting, spearheading the fast-moving Third Army, the 4th Armored swept from Normandy to Brittany to Lorraine to Germany. It made a notable 120-mile run to smash Von Rundstedt in the Ardennes.

5th—"V for Victory"

Long drives of 300, 130, and 100 miles featured the overseas service of the 5th Armored Division which fought at St. Lô, Le Mans, the Seine, Compiègne Forest, the Moselle, and in the December "Battle of the Bulge."

6th—"Super Sixth"

Landing at Omaha Beach in Normandy in July, 1944, the 6th Armored Division helped open a liberation path from Brest to Bastogne along the road to Berlin. It fought at Avranches, Lorient, Nancy, Metz, Bastogne, Weimar, Jena, and Gotha.

7th—"Lucky Seventh"

A valorous stand by the 7th Armored Division in Holland saved the British-Canadian Antwerp campaign by stopping a strong German counterattack. This division fought at Château Thierry, Rheims, against Von Rundstedt at St. Vith, and sliced across Northern Germany to the Baltic.

8th—"Iron Snake"

First taste of battle for the 8th Armored Division came in the Moselle-Saar salient. The 8th went to the relief of the British "Desert Rats" at Roermond, Holland, crossed the Rhine on March 27th, 1945, and overran a number of German cities, smashing the 116th Panzer Division en route.

9th—"Phantom"

Called the "Phantom" by the Germans, the 9th Armored Division seized the Ludendorf Bridge across the Rhine at Remagen, a feat which shortened the war by months. The 9th fought at Bastogne, St. Vith, Limberg and Leipzig.

10th—"Tiger"

First division in the Third Army to enter Germany, to capture a major German city—Trier, and to stop the Germans at Bastogne during the Ardennes breakthrough, the 10th Armored Division bagged 30,000 prisoners and took 450 towns in five months of combat.

11th—"Thunderbolt"

The "Battle of the Bulge" had just begun when the 11th Armored Division landed in Normandy and reached the Bastogne-Neufchateau area by a forced march. Battles in Belgium, Germany and Austria followed. In these battles the First and Seventh German Armies were destroyed.

12th—"Hellcat"

The 12th Armored Division takes pride in its capture intact of the bridge across the Danube at Dillingen and in its 37-day drive in Bavaria, during which it conquered 22,000 square miles, captured 63,000 Germans and freed 28,000 persons, to clear a path from the Rhine to Austria.

13th—"Black Cat"

The 13th Armored Division joined General Patton's Third Army in the closing stages of the drive to southern Germany, a surge that by-passed Berchtesgaden in the push to link up with the Russians. It crossed the Danube near Regensburg and was at Branau when Germany capitulated.

14th—Capturing 50,000 Germans, liberating 200,000 Allied prisoners, wiping out 450 German tanks and freeing 1,000 enemy-held towns, the 14th Armored Division drove 500 miles across the continent of Europe. It fought at Rittershofen, Neustadt, Schweinfurt and Moosburg.

16th—Eight thousand prisoners per day—that's the average for the 16th Armored Division. But the 16th was in combat only one day, at Pilsen, Czechoslovakia, where it made the big haul. The war ended before the division could go on.

20th—Although only briefly in combat in Europe, the 20th Armored Division served well under the Seventh Army, aiding in the drive on Munich, the capture of Traunstein, and the smash into Salzburg where it made a prize catch of Nazi generals.

An M4 tank of the 1st Armored Division, Fifth Army, crosses the Arno River ford in the Cascina area in Italy, September 1, 1944. Note other tanks on roadway.

A 3d Armored Division tank machine-guns snipers in a woodland site while en route along the Autobahn that leads into Dessau, Germany.

A half-track of the 2d Armored Division, 41st Armored Infantry, is received by the joyous Belgians as the vehicle enters Soignies, Belgium, on September 12, 1944.

Tanks and other armored vehicles of the 4th Armored Division halt momentarily in the open, flat countryside on a roadway that is near Contheil, France in December, 1944.

Book Reviews

THE NEW VETERAN. By Charles G. Bolte. Reynal and Hitchcock. $2.00.

Mr. Bolte was born in New York, grew up in Connecticut, and was graduated from Dartmouth in 1941. He did not wait for the United States to declare war on the Axis, but joined the British Royal Rifle Corps as soon as he received his diploma. He served a year in England, another in Middle East under Montgomery, fought against the North Afrika Corps and was wounded at Alamein.

On his return to the states he headed the American Veterans' Committee, made up of veterans of World War II. The Committee, which has as its slogan "Citizen first, Veteran second," has conducted a vigorous campaign against racial discrimination and has aligned itself with progressive groups.

The New Veteran is a coherent and intelligent presentation of the aims and ideas of a segment of our veterans of World War II.

In his first chapter Mr. Bolte quotes a statement made in 1920 by T. E. Lawrence: "We lived many lives in those whirling campaigns, never sparing ourselves any good or evil; yet when we had achieved, and the new world dawned, the old men came out again, and took from us our victory and remade it in the likeness of the former world they knew. Youth could win, but had not learned to keep, and was pitiably weak against age. We stammered that we had worked for a new heaven and a new earth, and they thanked us kindly, and made their peace. When we are their age, no doubt we shall serve our children so."

In a "Speech To Be Made After the War" the author explains why his own group joined the English army: "We went with no ideal of crusaders, without thought that we were fighting for a brave new world. There was no rosy-cheeked feeling in us of dying for an ideal, and little romance. . . . We felt we would be hard to disillusion, because we had no illusions.

"We had been well educated by honest books about the last war, and by parents and teachers who taught us that there is no good war, because in war no one wins. Then when this second war came, the war they had made inevitable by their refusal to accept the responsibility of having won the last war, they were distressed that we had absorbed their teaching, and called us weak, idlers and cowards.

"We reacted against their charges, and perhaps took longer to make up our minds than we would have taken if they had left us to do our own thinking. When we finally decided, when our convictions got the better of us—aided by our impulses, which had always been on the right side —we went.

"We didn't expect to like the army or anything about it. We went because the war was the big thing of our time and the soldier had again become the man who really moved things and decided issues: decisions subject to revision or even discard by politicians, by people at home, or by us when we were dog-tired of foreign countries after a foreign war; but nevertheless decision of the moment which soldiers alone could settle by force of arms."

In his explanation of the aims of his organization Mr. Bolte states:

"We are concerned with the military problem of security, the political problem of freedom, the economic problem of welfare, and the moral problem of justice. The problems are interrelated; their solution adds up to peace. But any easy dream of a brave new world will shatter, because there are too many concrete facts of existence and established order standing in the way of sudden change. Moreover, this country went to war because it was attacked by Japan and had war declared on it by Germany and Italy; if anybody is willing to fight for national survival alone, he is justified. But most of our allies are fighting for something better, and I think a lot of us are.

"The concept of a better world is not an idea or a dream: it is a matter of political necessity. . . . We can't expect everyone suddenly to become logical, and take the necessary steps over the obstacles which block the path to peace. I hope instead of deploring this fact we work with it and, like a good minority in a democracy, work until we make the majority change its mind and we in our turn become members of the new majority."

These excerpts give a general idea of the type of thinking to be found in this book. There are statements made which will not be concurred in by all readers, there are criticisms which may or may not be too harsh, but on the whole the book contains constructive rather than destructive ideology, well coordinated and well expressed. As an expression of the aspirations of a substantial portion of the new fighting generation, it warrants respectful attention and consideration.

* * *

THE CIANO DIARIES: 1939-1943. By Count Ciano. Doubleday, Doran. $4.00.

It is difficult to see why this important document should have been mangled and emasculated in the public press prior to its complete and unexpurgated publication. One can only hope that this premature release will not deter a large portion of the American public from giving careful attention to this important account of Italy's political and diplomatic involvement in the European imbroglio.

Count Ciano was one of those who distrusted Germany, but he was, to quote Mr. Wells in his excellent introduction: "The amoral product of a wholly decadent period in Italian, and, for that matter, in European, history. To him morality in international relations did not exist. He was wholly seized of the concept that only might makes right . . .", as a result he was unwilling actively to fight the dictator, although he consistently opposed Italy's entry into the war."

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These diaries were undoubtedly written with an eye to publication, and it must be recalled that Ciano was at one time a writer on the staff of a Roman daily paper. There undoubtedly is much that they do not tell, and much that they do tell is so shrewdly worded that one phrase balances another.

The authenticity of these diaries is attested to in his excellent introduction by Mr. Wells, to whom Count Ciano showed them in 1940.

* * *

WAITING IN THE NIGHT. By George Millar. Doubleday, Doran. $2.75.

Perhaps the most interesting stories of this war are those of the resistance movements kept alive in the European countries under German occupation. Underground workers were often recklessly brave, frequently foolish, sometimes unschooled in war, sometimes strong, at others unexpectedly weak. Their stories are often tragic, but never dull.

More than most *Waiting in the Night* brings out the human weaknesses of untrained civilians that must be overcome in order to coordinate successful armed resistance.

George Millar, an Englishman who had escaped from the Germans, was parachuted to France in June, 1944, to join the Maquis. He worked with several groups in the Besancon area, teaching the Maquisards the use of the firearms sent them, arranging for supplies, and directing sabotage.

His book is extremely well-written, and the characters who move through its pages become alive as he skilfully emphasizes their peculiarities and tolerantly views them as individuals with different natures, varied backgrounds, and distinct contributions to make to the cause of French liberation.

* * *

FOUNDATIONS OF NATIONAL POWER. Edited by Harold and Margaret Sprout. Princeton. $4.25.

The editors of this book are the well-known authors of *The Rise of American Naval Power* and *Toward a New Order of Sea Power*. Harold Sprout is a professor of politics at Princeton University, but during the war he has devoted most of his time to the Navy Department, the War Department, the Department of State and the OWI.

The book is described as "readings on world politics and American security." Its introduction states: "The Second World War has altered profoundly the relations of the United States with other nations. Venerable foreign policies—such as neutrality toward European wars and avoidance of military alliances with foreign powers—require fresh appraisal in the light of changing conditions." The material has been culled from the statements of authorities on world conditions and political and economic history in order that the thinking American may be informed on the subjects pertinent to the nation's responsibilities in the world's new order.

THE BASIC MANUAL OF MILITARY SMALL ARMS. By W. H. B. Smith. Military Service. $5.00.

When the first edition of this extraordinary compilation of small-arms information was originally published, it was hailed as one of the most valuable books on domestic and foreign small arms. In its expanded edition it becomes even more important to the soldier, collector, manufacturer and designer as well as the non-expert interested in the subject.

Correlating information otherwise only obtainable in scores of manuals, many of them unavailable, this book was originally published to give our men in a single volume the material to enable them to identify and operate their own and captured enemy weapons. It should be included in every military library.

The remarkably clear and simple photographs and drawings teach step-by-step all of the essential details necessary to an understanding of the arms. The text has been simplified in order to provide the novice as well as the expert with the key to an understanding of foreign as well as domestic small arms.

The author was employed by Armstrong Vickers, by the Secretariat of the League of Nations as an arms expert, and is at present Consultant on Military Weapons to the National Rifle Association. He has brought to his task a thorough firsthand knowledge of weapons and a deep concern lest we allow our arms to stagnate as we did after the last war. In this respect the *Author's Note* should be carefully read.

✓ ✓ ✓

AUTOMATIC WEAPONS OF THE WORLD. By Melvin M. Johnson, Jr. and Charles T. Haven. William Morrow & Co. $7.50.

Automatic Weapons of the World, completed at the close of World War II, lists all the military automatic arms, new and old, from pistols up to 40mm automatic cannon, that were used by both the Axis and the United Nations. In addition it covers early and experimental automatic weapons of all types from 1885 to 1945, and sporting automatic rifles and shotguns and pocket pistols in use up to the present time.

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THOROUGHBRED RACING AND BREEDING. Edited by Tom R. Underwood. Coward-McCann. $4.00.

This new book on the origins and development of racing is a welcome addition to the small selection of books on horsemanship now available. Particular emphasis is placed on the background, history, and contemporary state of breeding in this country.

Edited by Mr. Underwood, the book is the combined effort of some of the best known writers on the turf. The illustrations are excellent, the subject matter interesting, and the general format of the book reminiscent of prewar publications.

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BEACH RED. By Peter Bowman. Random House. $2.50.

This remarkable little volume, contrary to the publisher's blurb, *is* a war story—an hour in the life of a soldier from the time he climbs off a transport to land on a Pacific island, until he is killed in the jungle.

The form used is a loosely constructed blank verse which reads as prose but has a cadence that emphasizes the action described in an extraordinary fashion. The author's mastery of language is superb, and coupled with his perception produces a remarkable piece of literature.

Mr. Bowman not only has the ability to express human reactions, his observations of the animal and plant world surrounding him are equally keen and some of his best description is of the jungle and the sea. His adaptation of army orders and instructions to the half-bantering, half-bitter thoughts and words of the character is exceptionally skillful.

The book is not without its faults. There is occasional wordiness—probably the result of the novel style used—and a tendency to force epigrams and metaphors, but these weaknesses do not materially detract from the fact that this narrative is a brilliant piece of work by a young man whose literary career should be watched.

* * *

A RIBBON AND A STAR. By John Monks, Jr. and John Falter. Henry Holt & Co. $2.75.

ON TO WESTWARD. By Robert Sherrod. Duell, Sloan and Pearce. $3.00.

A Ribbon and A Star by the author of *Brother Rat* is the account of one small segment of a campaign. The material has been drawn from personal experience, and in spite of a tendency on the part of the author to dramatize his characters, moves with a swift clear realism. The illustrations by John Falter are excellent sketches done with a fine appreciation of the importance of good craftsmanship.

On to Westward recounts the story of the war in the Central Pacific as seen by the author of *Tarawa*. Mr. Sherrod is a balanced sure reporter, and his books on the war are materially enhanced by the fact that he does not attempt to cover too much territory, but confines his efforts to closely related accounts of small actions of which he has detailed knowledge.

Markedly different in style, both of these books bear the stamp of sincerity, and while not great, will contribute to the civilian's knowledge and understanding of war in the Pacific.

* * *

FIGHTING DIVISIONS. By CWO E. J. Kahn, Jr. and T/Sgt. Henry McLemore. Infantry Journal. $2.50.

It is difficult to weigh the value of this compilation of thumbnail sketches of the records of combat divisions in World War II. Limited to this war's exploits, the book is valueless as a history of the divisions, and the sketches are too concise to even give a full account of recent activities. As a 25¢ pocket pamphlet it might have a very slight reference value for refresher purposes but it does not warrant the fine format given it.

SOLDIER OF DEMOCRACY. By Kenneth S. Davis. Doubleday, Doran. $3.50.

Biographies of living men are generally written by two types of authors—those so enamoured of their subject that they are completely blind to his faults, or so bent on the destruction of a character that they will grant him no virtue. In his biography of General Eisenhower, Mr. Davis obviously falls into the first catagory. It would be illogical to expect a dispassionate and objective picture of a popular war hero at this time. Actually, Mr. Davis has done as good a job as could be expected. He has given the general public a great many personal facts that will help to make this dominant war figure more of a human being. But he has done his idol a disservice in making him too perfect, and in attempting to forestall any criticism of certain actions of questionable wisdom by tossing the blame into the air and allowing it to fall anywhere so long as it does not touch the General.

SOLDIER OF LIBERTY: Casimir Pulaski. By Clarence Manning. Philosophical Library. $3.00.

Casimir Pulaski, the first Chief of Cavalry in the Continental Army of the United States, was one of the many romantic foreign figures coloring the early pages of our history.

Unfortunately, the first two-thirds of what should have been a brilliant and scintillating biography of a gallant, headstrong, often irascible and stubborn man, sinks into a monotonous monologue on Polish intrigue. Unless the reader is well versed in the history and politics of 17th and 18th century Poland he will find it impossible to understand the balancing factors which build up to Pulaski's exile.

The last third of the volume is more interesting, because the reader is familiar with the names and circumstances mentioned. However, much of the material is reminiscent of Charles Francis Adams' *Studies Military and Diplomatic* in which a shorter but far more alive description of the great cavalryman during his service in the Continental Army appears.

LEGEND OF A MUSICAL CITY. By Max Graf. Philosophical Library. $3.00.

The author has enjoyed the intimate friendship of the musical stars of the last 50 years, and is imbued with the melody that echoes from house to house and from block to block in Vienna. He has drawn on this valuable background to describe the development of Viennese music through the interweaving of folk and religious themes, and the gradual absorption of neighboring contributions. He conducts the reader on a tour of the houses in which the musicians composed their work, the churches in which it was played and sung by choir members who were the greatest artists of their day, and the palaces and parks where the gay and pleasure-loving Viennese sang and danced.

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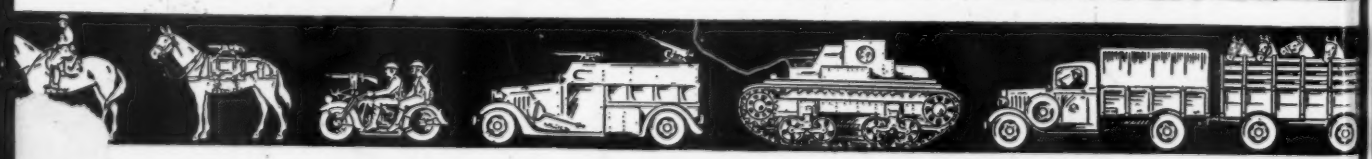
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